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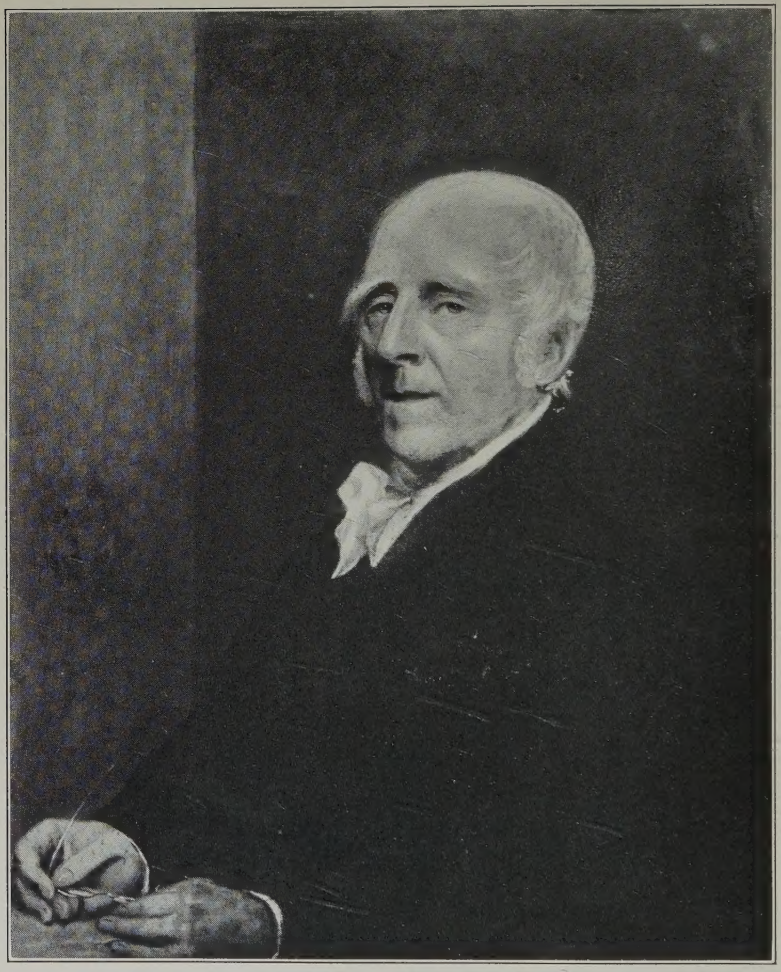

COLONEL JOHN STEVENS OF HOBOKEN

JOHN STEVENS

An American Record

BY

ARCHIBALD DOUGLAS TURNBULL

NEW YORK

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

1928

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ALEXANDER CROMBIE HUMPHREYS

INSPIRED THIS BOOK AS ONE INCIDENT OF A GALLANT LIFE,
CHEERFULLY SACRIFICED TOWARD THE COMPLETION
OF THE INSTITUTE OF TECHNOLOGY, AS A
REAL MONUMENT TO THE IDEALS
OF JOHN STEVENS

PREFACE

Every pioneer is, by definition, the first in his field, the breaker of fresh ground, and the sower of seed. Usually, his energies are confined to one chosen field and rarely does he live to see it come to fruit. John Stevens worked in a dozen fields, not always reaching the end of the furrow but almost unfailingly foreseeing that end. Moreover, just a century ago, when he was eighty, he saw his two brightest dreams come true. The Stevens steamboats were then the fastest in this country and the great era of American railroad building was at last fairly begun. It detracts nothing from his farsightedness that it should have required this additional century for men of to-day to learn how to accomplish the engineering triumphs that he was not afraid to attempt.

Behind him, he left an amazing collection of private letters, essays, drawings, patents, maps, deeds, and contemporary newspapers, all covering not only his own days but also those of his father and his grandfather. There are the letters he received, with his laborious copies of the answers returned; the letters of many members of his immediate family, addressed to himself or to one another; and the great number of documents and pamphlets which he himself had printed or which were sent to him by scores of friends among scientists, statesmen, and all other men of mind. The whole makes a story which, for one reason or another, has appeared only by widely scattered and often quite inaccurate bits in print.

It is this collection that I have been permitted to explore, and for the privilege I have particularly to thank that descendant of John Stevens who is most steadfast in the family tradition—his granddaughter, Mrs. H. Otto Wittpenn. Without the deep interest of Mrs. Wittpenn, the work could not have been begun, much less finished. In the same connection, among other descendants, I am indebted to Mr. Theodosius Stevens and Mr. Basil Stevens.

To name all the others who have assisted would be to list the Library of Congress and the many libraries and historical societies in this and other sections of the United States. From their treasured manuscripts they have contributed a fact here, a date there, and a useful hint somewhere else; always in a genuinely helpful spirit unquenched by a horde of researchers. I should also have to enumerate friends who had friends, acquaintances who happened to know antiquarians, and casual passers-by who gave nothing more tangible than encouragement. And I should certainly have to recognize the patience of an immediate family, compelled for months to listen to no other subject. Among all these, I must not fail to speak of the work of Mr. Eugene B. Cook some fifty years ago, when he made painstaking copies of many of the old letters. Only by the light of these copies has it been possible to read certain papers that have faded sadly in the interim. Fifty years ago, when John Stevens came within the memory of living men, this book should have been written.

It is my very great regret that Doctor Alexander C. Humphreys was not here to help finish the book as he helped to begin it; to see what came through the many doors to information opened by his influence and his unflagging interest. He had worked hard to win for John Stevens and his sons their proper place in the history of that great profes-

sion of which he was himself an ornament—creative engineering. Had he waited to criticize this record, the figures in it would stand out more clearly against their pioneering background.

A. D. T.

LANNOCK,
February 1, 1928.

CONTENTS

CHAPTER		PAGE
I	A genius of transportation—Kayaderosseras and commerce—Ann Campbell Stevens—early Jersey stage-coaches—citizen and office-holder—the first American generation	3
II	The Honorable John Stevens—shipmaster and merchant—partnership with Stirling—family correspondence—young Johnny at Perth Amboy—politics and preparedness—number seven Broadway—a Jersey road commissioner—fighting the stamp act—young Johnny's impressions	22
III	Livingstons in politics—running the boundary line—marriage of Mary Stevens—eve of the Revolution—impressions of the Revolution—the colony's treasurers—Johnny joins the army—a treasury on horseback—Stirling at Germantown—Lord North and taxation—welcoming British deserters—hard-pressed representatives—Major John at Philadelphia	43
IV	Marriage to Rachel Cox—complicated currencies—a spoonful of creamer tartar—the White Green Cliffe—the old Bayard estate—the colonel's first two sons—the Hoboken Ferry—the Federal Constitution—the colonel on John Adams—common sense in government—ratification in New Jersey—frills and furbelows—a candidate for Congress	73
V	James Rumsey and John Fitch—more power and more speed—the New York petition—urging a patent law—slow progress with patents—improve-	

CHAPTER PAGE

ments in boilers—the Honorable John's last years —New York in the gay nineties—thickness of a worn shilling—steam pistons of cork 100

VI Floating hospitals—Livingston on treaties—horse-boats and John Fitch—Fitch is persistent—a new boat at Belleville—the chancellor's proposals—a steamboat on the Hudson—side-wheeler or stern-wheeler—Marc Brunel an assistant—internal combustion 120

VII The colonel as horticulturist—as consulting engineer —Aaron Burr's Water Company—Hoboken Ferry rates—paddles in the stern—the three cornered agreement—justice for Roosevelt—another new engine—Livingston on Napoleon—illuminating gas 143

VIII New Jersey turnpikes—a new Stevens boiler—the colonel as landlord—development of Hoboken—first news of Fulton 167

IX The screw propeller—the first turn screw—the propeller in history—forty years after—John Cox sails for England—John Cox in England—a visit to James Watt—Watt and Boulton 185

X The strategic artery—floating bridges—the Stevens vehicular tunnel—defending New York City . . 213

XI The Hudson monopoly—the steamboat *Phoenix*—opening the debate—narrow wheels or wide—the colonel on patent law—lengthwise and crosswise—the patent law defined—a boomerang argument—the genius of monopoly—animadversions—the compromise offer 230

XII Launching the *Phoenix*—early speed trials—relations with Livingston—the New Brunswick line—an amazing discovery—the value of a patent—a

CHAPTER PAGE

sporting proposition—studying the Delaware—Robert and the *Phoenix*—an ocean steamer's log 256

XIII First ocean steamer's inventory—the compromise—improving the *Phoenix*—the Jersey stage-coaches—a growing enterprise—prospects of competition—the New York ferry lease 280

XIV Plans for the Chesapeake—for better and faster boats—an astonishing patent—the first regular steam ferry—Aaron Ogden in the game—improving the *Phoenix*—Baltimore and Philadelphia—offers to build a navy yard—Castle Point as fortress—the colonel wants more speed 301

XV Dredging the river—Fulton is acrimonious—plans for southern waters—the North Carolina grant—monopoly loses a partner—new compromise proposals—fighting for North Carolina—the colonel vindicated—the war intervenes—old Sal against the eagle—progress on the Delaware—the colonel wants more speed—Aaron Ogden joins battle . 327

XVI The railroad vision—answering the doubters—canal versus railroads—Evans shares the vision—the colonel runs a survey—New Jersey is indifferent—the first American charter 357

XVII The Stevens projectile—a weapon against pirates—plans for steam frigates—argument with the army—proposals to the Czar—a United States contract—for a mobile navy—the shellbacks object—the colonel offers a wager—exchanging hot shots 386

XVIII Urging naval reorganization—the world's first ironclad—delays discourage Robert—developments in gunnery—comments by the press—Edwin under-

CHAPTER PAGE

takes the work—the little *Naugatuck*—further efforts of Edwin—a bitter disappointment . . 412

XIX The knell of monopoly—back on Hudson—Providence to Savannah—activities of Gibbons—Binney on patents—sanitation in the city—Philadelphia to Pittsburgh—progress with ferry-boats—spring at Castle Point—family characteristics—still gunning for pirates—*Hoboken* and *Pioneer*—Robert builds the *Trenton* 434

XX The great steamboat case—renewing the railroad fight—fresh reasons for railroads—first Pennsylvania survey—old and new arguments—the Pennsylvania main line—the first steam railroad . 462

XXI *Burlington* and *Fairy Queen*—sportsmen and engineers—building always for speed—fresh efforts at Hoboken—a family interest to-day—an aerial railway—a New York elevated road—New Jersey awake at last—the American steel rail—Stevens and Stephenson—the Camden and Amboy . . . 484

XXII Sportsmen in the country—sportsmen afloat—Commodore John Cox—Edwin afloat and ashore—the colonel and his family—dips into metaphysics—political economy—Stevens Institute of Technology—the prophecy fulfilled 510

Index 531

ILLUSTRATIONS

COLONEL JOHN STEVENS OF HOBOKEN . . . . *Frontispiece*

FACING PAGE

QUEEN ANNE'S GRANT OF THE FIRST LAND OWNED BY A STEVENS IN AMERICA 7

ONE OF COLONEL JOHN STEVENS'S EFFORTS TO PROMOTE HOBOKEN BY BROADCAST 18

THIS INDENTURE BROUGHT THE FIRST STEVENS TO AMERICA 17

A BILL OF LADING FROM THE HONORABLE JOHN STEVENS . 24

JOHN STEVENS, FOUNDER OF THE FAMILY IN AMERICA . . 32

MR. J. STEVENS APPOINTED CHANCERY CLERK 48

APPOINTMENT OF THE HONORABLE JOHN STEVENS TO THE NEW JERSEY COUNCIL 65

RACHEL COX STEVENS 81

COLONEL JOHN STEVENS APPOINTED TREASURER . . . 96

THE EARLIEST STEVENS ENGINE, A DRAWING EVENTUALLY USED TO PROMOTE THE FIRST UNITED STATES PATENT LAW 106

THE HONORABLE JOHN STEVENS OPPOSES THE STAMP ACT 112

TWO EARLY SKETCHES BY COLONEL STEVENS 129

THE COLONEL'S DRAWING OF A FLOATING BRIDGE . . . 134

A LENGTH OF NEW YORK'S FIRST WATER MAIN 145

THE VILLA STEVENS 1787-1861 160

A STEVENS PLAN FOR DEFENDING NEW YORK CITY . . . 170

THE ELYSIAN FIELDS 176

THE "JULIANA'S" BOILER 188

FACING PAGE

THE COLONEL'S BLADE OF 1804 AND THE COPIES OF 1844 193

THE ORIGINAL TWIN-SCREW ENGINE 193

THE 1844 REPORT OF THE PROPELLER OF 1804 . . . 199

COMMODORE JOHN COX STEVENS 209

THE HUDSON TUNNEL AS COLONEL STEVENS SAW IT . . . 224

COLONEL STEVENS TO DOCTOR HARE 225

A COACH AT THE DOOR OF NUMBER SEVEN BROADWAY . . 240

EDWIN AUGUSTUS STEVENS 257

THE FIRST SUBSCRIBERS TO THE BRUNSWICK LINE . . . 263

THE "PHOENIX" AT SEA 273

JERSEY CURRENCY SIGNED BY COLONEL JOHN STEVENS . . 288

ROBET LIVINGSTON STEVENS 304

JAMES ALEXANDER STEVENS 321

A MODEL OF THE "LITTLE JULIANA" 337

THE ORIGINAL ENGINE AND BOILER 337

COLONEL STEVENS' DRAFT OF AN ADVERTISEMENT OF HIS FERRY-BOATS 349

STEAM CUT-OFF PERFECTED BY FRANCIS BOWES STEVENS . 352

THE FIRST AMERICAN PUBLICATION ON RAILROADS . . . 368

"JOHN BULL," BUILT BY ROBERT STEPHENSON FOR ROBERT STEPHENS 385

THE STEVENS BATTERY 391

FRANCIS BOWES STEVENS 401

THE STEVENS BATTERY ON THE WAYS 416

WHAT WAS EXPECTED OF THE BATTERY 416

BLOCKS USED BY ROBERT STEVENS, CAMDEN AND AMBOY RAILROAD 432

PENNSYLVANIA'S EARLY LEGISLATIVE ACTION ON THE RAILROAD QUESTION 441

FACING PAGE

THE FIRST AMERICAN LOCOMOTIVE ON WHEELS AT CASTLE POINT, HOBOKEN 449

COLONEL EDWIN A. STEVENS, JR. 465

THE EARLY STEVENS IDEA OF RAILROADS 473

STEVENS INSTITUTE OF TECHNOLOGY, CASTLE POINT, HOBOKEN 497

SKETCH OF THE WORLD'S FIRST T-RAIL 501

THE STEVENS SLOOP "MARIA" 512

A CARTOON OF THE "AMERICA" AND HER VICTORY . . . 512

JOHN STEVENS: AN AMERICAN RECORD

"The wealth and prosperity of a nation may be said to depend, almost entirely, upon the facility and cheapness with which transportation is effected internally."

JOHN STEVENS, 1806

"It would be difficult to conceive of any modern activity which contributes more to the necessities and conveniences of life than transportation. Without it our present agricultural production and practically all of our commerce would be completely prostrated."

CALVIN COOLIDGE
Message to Congress, December, 1926

JOHN STEVENS: AN AMERICAN RECORD

CHAPTER ONE

Colonel John Stevens was so fortunate as to live through those years that historians consider the most vital in the making of America. Leaving the Continental army, after the Revolution, for the arts of peace, he became a figure in American social, commercial, and scientific circles, while outside these limits—in England, for example—he was not unrecognized. As the second war with Britain drew near he stood at the height of his powers, not content with achievements already behind him but pushing vigorously on toward new ones. For a personal glimpse of him at that moment we have his own request for the help of Dr. William Thornton, superintendent of the United States Patent Office, in securing a European passport in 1810:

> John Stevens of the City of New York in the State of New York. Was born in said City. 5 feet 7 inches tall. Hair gray. Eyes gray. Complection rather fair. Forehead high and somewhat bald; person and visage neither thin nor very full.

Habitually exhaustive in all that he said or wrote, he drew of himself only the modestly inadequate sketch that might fit any average man. He suggested nothing of all that lay behind the high and somewhat bald forehead; he gave no hint of how far down the coming century those

gray eyes were able to pierce. It is clear that he thought of himself as in the prime of life, for he ended his description with the words "Aged 51 years." His miscalculation forced him to send a hurried second note to Thornton, correcting his age to *sixty*-one, because he had been born in 1749.

Few will venture to dispute Colonel Stevens's assertion that efficient transportation, on land and water, has been and is the greatest single factor in the progress and prosperity of these United States. Yet a fact made plain to us by the whole library of volumes written to prove it was, in his day, a mere theory—dimly appreciated by scattered individuals, but wholly unrecognized by the masses. During the first half of his life, transportation, properly speaking, did not exist in America. There was no real intercolonial commerce, nothing approaching adequate mail-carriage, and no true interchange of political views among our few million inhabitants. In the creation of a nation, by welding thirteen disjointed, virtually independent republics, nothing would have been more vitally helpful than good transportation. The lack of it complicated every one of the numberless problems confronting those bewildered but intrepid men who framed the Constitution and sought to make it effective. No one appreciated this more fully than did Stevens.

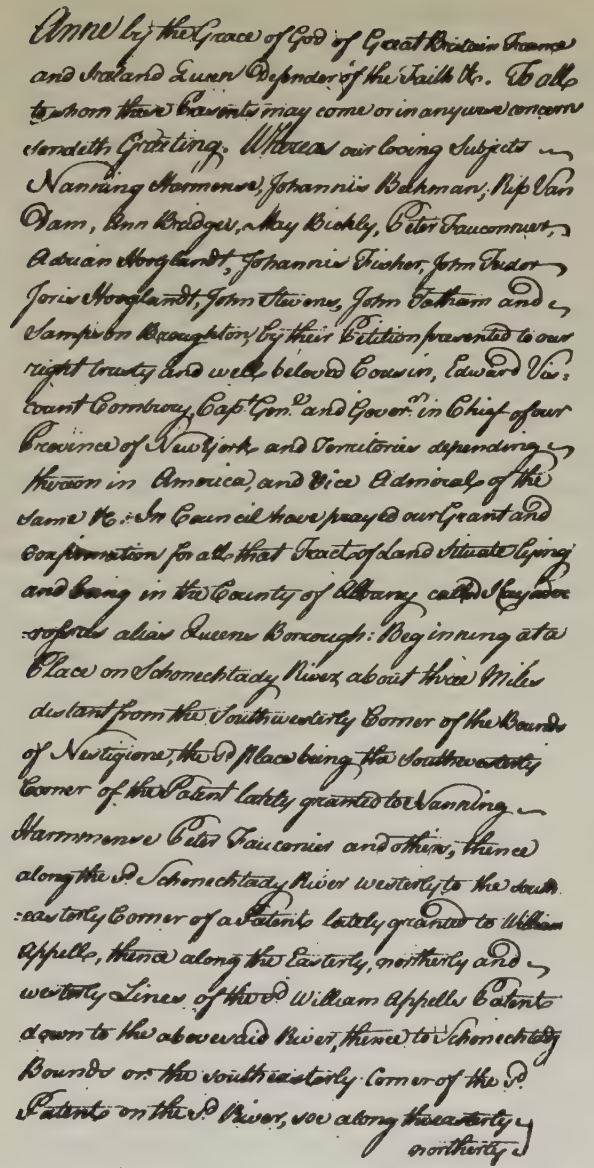
The same vital lack affected habits of thought and the style of everyday living. Because it took a week to drive from Boston to New York, or to ride from Monticello to Philadelphia, the citizens of one section struggled along without the ideas or products of another section. Even "news" meant information a month old when it was received—until the force of steam, thrust like a lever under the whole sticky and infertile mass, overturned it and allowed a new civilization to grow and flower.

John Stevens was a genius of steam. We accept a modern President's message on transportation as axiomatic, because John Stevens steadily preached and practised the same text a century and a half ago. As the leading steamboat man of 1800, Stevens built craft that preceded all others of importance on the Hudson and embodied a design destined, thirty or forty years later, to alter the whole science of steam navigation. On land, he began twenty years ahead of his American contemporaries a single-handed fight for the recognition of steam. In the face of skepticism and ridicule, he gained one great objective in that fight by building and operating the first "steam-carriage" ever run upon rails on the American continent. To any truly progressive plan for passenger-travel or freight-haul he gave his support with unflagging enthusiasm and with all the mental or material means at his command. In fact, had other leading men of his day been less deeply immersed in politics and more fully endowed with the vision that was his, the extraordinary stride of America to world-power would have occupied a historical chapter even briefer than the one it fills.

Occasionally hinted at, in connection with accounts of other men, the colonel's own story has never been told. In the long course of his ninety years he identified himself most particularly with the two States bordering upon the Hudson, New York and New Jersey, but wider-spread activities carried him into Connecticut, Pennsylvania, Virginia, and North Carolina. As a young officer of Washington's army he measured his country's possibilities with no mere pocket-rule but with a surveyor's chain. As a venerable sage in Andrew Jackson's time he was still drawing designs of ships and locomotives or writing to urge stronger national and international policies with a pen that had not run dry when at last it fell from his fingers. So varied were his interests

that it is difficult to understand how, in that day of absurdly primitive communication, he found time and courage to pursue them all with tireless energy and rare far-sightedness. That he did so pursue them is proved by his story, told chiefly in his own words and those of his countless correspondents.

Certain chapters of his story overlap the limits of his own years. Some of his conceptions came too early in the history of the age of invention, when no country was prepared, mentally or mechanically, to appreciate them. This fact places his name among the dreamers of great dreams. Frequently those conceptions, modified and improved by progress in the arts and sciences, came to realization through the inventive or administrative ability of one or another of his many descendants. Where he had planned, they built. It was not the least of his attainments that he fathered distinguished men and gave them a training broader and deeper than his own. Thus no account of him could be complete without particularly including his sons John Cox, Robert Livingston, and Edwin Augustus Stevens; while certain grandsons, too, played their part. Similarly, to understand his interests, enthusiasms, and achievements, those who went before him must be considered. From the material standpoint, as well as from that of experience in public affairs, he had a far better background than his contemporary pioneers in engineering. Half a century before his birth the American foundation of his family was laid. Upon that foundation he raised himself among his fellows as "Colonel Stevens, of Hoboken"—a progressive farmer and fervent horticulturist; a close student of law and an eager amateur in medicine, metaphysics, and political economy; a philanthropist, an advanced naval architect, and a foremost mechanical engineer.



Anne by the Grace of God of Great Britain France
and Ireland Queen Defender of the Faith &c. To all
to whom these Presents may come or in anywise concern
sendeth Greeting. Whereas our loving Subjects
Nanning Harmense, Johannis Bekman, Rip Van
Dam, Ann Bridges, May Bickly, Peter Fauconnier,
Adrian Hooglandt, Johannis Fisher, John Tudor
Joris Hooglandt, John Stevens, John Tatham and
Sampson Broughton, by their Petition presented to our
right trusty and well beloved Cousin, Edward Vis:
count Cornbury, Capt. Genl. and Govr. in Chief of our
Province of New York and Territories depending
thereon in America, and Vice Admiral of the
same &c: In Council have prayed our Grant and
Confirmation for all that Tract of Land Situate lying
and being in the County of Albany called Kayadoc
:rossas alias Queens Borrough: Beginning at a
Place on Schonechtady River about three Miles
distant from the Southwesterly Corner of the Bounds
of Nestigione, the Sd. Place being the Southwesterly
Corner of the Patent lately granted to Nanning
Harmmense Peter Fauconier and others, thence
along the Sd. Schonechtady River westerly to the south
:easterly Corner of a Patent lately granted to William
Appell, thence along the Easterly, northerly and
westerly Lines of the Sd. William Appells Patent
down to the abovesaid River, thence to Schonechtady
Bounds on the southeasterly Corner of the Sd.
Patent on the Sd. River, soe along the easterly
northerly

QUEEN ANNE'S GRANT OF THE FIRST LAND OWNED BY A STEVENS IN AMERICA

The first stone in the foundation was laid by the colonel's grandfather, also christened John Stevens. When he landed in America in 1699 he was an indentured youngster of seventeen. His father, Richard Stevens of St. Clement Danes, the Strand, London, had followed the prevailing custom by binding him for seven years to Barna Cosans of the city and province of New York. Since Cosans was crown attorney, clerk of the royal council, registrar and examiner in Chancery, and sometime governor's secretary, he may fairly be called a busy man for any young immigrant to serve as clerk.

Records of this earliest John Stevens are somewhat faded by the years, but there remains enough to suggest his success in living up to a promise to "doo no damage to his saide Master nor see it to be done of others," after the manner in which an "honest, diligent, and faithful Apprentice" should "demean and conduct himselfe." As was natural in a boy who reached America in the year of Captain Kidd and the *Adventure Galley*, he went a-privateering with Colonel William Peartree, once the mayor of New York city. But there can hardly have been great profit for young Stevens in that expedition, since we find him, soon after it, petitioning governor and legislature for his "just compensation" as field clerk—£7 11s. However, when his indenture term expired he had sufficient means and standing to become, in 1708, one of the thirteen original patentees of the Kayaderosseras tract.

This was a great stretch of country in the Lake George and Saratoga section of New York. Eventually it became the subject of much involved litigation when Sir William Johnson, the squaw-man general, joined with others who insisted that good Queen Anne, in bestowing this land upon "these, her thirteen loyal and devoted subjects," had actually

been guilty of robbing the aboriginal redskins. But young Stevens escaped this; before the tract began its lingering existence in Chancery he had conveyed, to Patrick MacKnight, the first land owned by one of his name in America. The deed describes him as "writing-master," and he did teach hand of writ and elementary subjects in New York city schools. This must have been for mental relaxation or stimulus rather than for a livelihood, since he was already taking shares in commercial ventures, trading with Britain and the Canaries in such commodities as sugar and molasses, fine wines and liquors. Very soon fresh interests beckoned.

Across the Hudson lay "all that tract of land adjacent to New England and lying and being to the Westward of Long Island and Manhitos Island, bounded, on the East, part by the main sea and part by Hudson's River"; the land known to the Indians as Scheyichbi, called in formal language Nova Caeserea, and familiar to modern ears as New Jersey. To it the system of government inaugurated by Berkeley and Carteret had drawn many immigrants; in their steps followed the ex-apprentice, to make the creation and maintenance of New Jersey a Stevens enterprise long years before she became a State in the Union.

He found East Jersey still disturbed by quarrels between the common people and the Proprietors, of whom there were by this time twenty-four—some actually present in person, others represented by proxy. These Proprietors were unwilling to surrender the *ownership of land* as well as *the right to govern.* Those of them who were not Quakers and therefore violently opposed to the dissolute Cornbury and his whole *régime,* submitted to the crown rule he established in 1702 but would not admit "squatters' rights." On the other hand, the common settlers held that the land was theirs both by Indian deed and by royal grant; they refused

to be thrown off it. The Monmouth purchase and the Elizabethtown purchase were well-known cases in point. Stevens himself was soon to become involved, on the Proprietors' side of the struggle.

Economically, he found all the settlers—planters in the west, townspeople in the east—a crew of speculators. Mile after mile of magnificent virgin timber was tempting them to press inland, cutting and slashing without a thought for posterity. Sawmills of the crudest kind were springing up, to be quickly followed by gristmills; a new clearing was hardly made before it was dotted with houses in which the living was comfortable enough of its kind. The hardest work was being done by black slaves, already increasing under Cornbury's instructions from England that "the traffic in negroes be encouraged." For amusements, the whites had husking-bees, sleighing, and skating; in every clearing a tavern arose almost as soon as the first three houses were finished. Such a life spelled opportunity for Stevens.

Communication was miserable. From where Camden now stands a trail followed Cooper's Creek past Berlin and then skirted the Great Egg River to the sea. Another, beginning at the early Salem settlement, led to Camden, Burlington, and Trenton. By fording streams, a short, barely passable route connected Trenton with Amboy. Along such as these, men who were slowly beginning to think of themselves as Jerseymen made their way, the lumberjacks dragging in oak, pine, and white cedar for the early shipbuilders along the coasts. What little trace of interstate commerce existed was held by the assembly to be in the hands of monopolists, but this was entirely approved by the governor.

At present [he wrote in 1707] everyone is sure, once a fortnight, to have an opportunity of sending any quantity of

goods, great or small, at reasonable rates, without danger of imposition; and the sending of the waggon is so far from being a grievance or monopoly that, by this means and no other, a trade has been carried on between Philadelphia, Amboy, and New York, which was never known before.

In the prosperity of the province this primitive trade had no great part. "Land," says Francis B. Lee, the Jersey historian, "was the chief source of wealth. From the farm sprang the activities . . . while economic legislation was directed, to a limited degree, towards the fostering of agriculture." That Lee was right is shown by the change in young Stevens's plans. He had come to Jersey primarily because he had heard glowing accounts of copper mines discovered in "the Devil's Feather Bed" near Rocky Hill. As the shadows of departing Quakers moved westward, revealing the surface of the land, he saw that staking out claims over that surface would be more profitable than bothering to dig under it. He decided to go in for land.

A step in the right direction was his marriage, in 1714, to Ann Campbell. Family tradition makes Ann the niece of Lord Neil, deputy governor of the province, but among so many nobles and simples of the Campbell clan in Jersey —exiled Covenanters or hopeful fortune-seekers—this cannot definitely be established. She was certainly the daughter of John Campbell, American proxy of Drummond, Earl of Melfort, and, as such, the owner of a share in Melfort's holdings as one of the twenty-four Proprietors. John Campbell had been in Jersey for years, serving as a justice of the Court of Common Rights—what we know as Errors and Appeals; as a deputy from Amboy town to the provincial assembly, and as one of the commission appointed to draw a line between East and West Jersey. It was this Campbell who bought, from a certain Moneybaird, a large slice of

Amboy at the cost of "a footmann in velvett" to wait upon Moneybaird and hold his stirrup "dureing the tyme of Parliament" in Jersey. Land was John Campbell's business and all his wealth was in real estate.

Essentially, marriage with Ann Campbell meant two things for her husband, the former apprentice and writing-master. Immediately it gave him a status in the community as "Mr. J. Stevens." More remotely it made him the ancestor of six American generations, in each of which there has been another John Stevens, eldest son of each generation except the first. Quite possibly, too, it was the Scots blood of this original mother that gave the whole family its bent toward engineering.

At the outset, however, land was the chief interest. J. Stevens embarked with his father-in-law in a business which was a combination of acting as agent for estates with speculating on their own account. Their affairs prospered from the first; very soon they extended them through wide operations in connection with John Johnston and his son Andrew, the former a power among Proprietors and a frequent office-holder in both Jersey and New York, the latter the better remembered of the two because he kept a diary which was finally deciphered and printed. The Johnstons knew all there was to know about buying land and selling it at a nice profit in a colony where the seventeen-twenties saw a very flourishing boom in real estate.

J. Stevens learned the game rapidly. Very shortly his name began to appear with great frequency in options, deeds, mortgages, and every conceivable lien upon land. Naturally, he retained title to a good many of the acres that were passing through his hands, and to these his wife eventually added a considerable inheritance from her father. Ann Campbell Stevens's "near two thousand acres," on the

west bend of the South Branch, Raritan River, and close beside Andrew Hamilton's estate, undoubtedly furnished her husband with his reason for acquiring a large share in the old Redford's ferry to Amboy. This long remained a family property, its purchase being the first definite step that brought the Stevens's face to face with their favorite problem—transportation.

This was certainly a problem crying aloud for solution. In the first quarter of the century almost nothing was done to make a journey between two towns comfortable, speedy, or even safe. By 1728 there was a fairly regular stage connecting Redford's ferry with Burlington, a clumsy affair, bumping along over incredibly bad roads, carrying both passengers and freight, to the agony of the one and the peril of the other. Those were the days when a driver had to prevent his stage from capsizing on the curves by shifting his human ballast. "All lean to the right now, gentlemen, if you please!" Or "All to the left here, thank you!" Those were the common cries of the road; while a hair-trunk or two was apt to roll off into the mire at any moment.

One could never be sure that a stage would leave, much less arrive, on scheduled time. Indeed, it was not until ten years later that "The Philadelphia Weekly Mercury" could announce "a stage-waggon to Accommodate the Public" by beginning to run "on Mondays and Thursdays from Trenton to New Brunswick, returning Tuesdays and Fridays; Rates Two Shillings Six Pence each Passenger." And when there appeared advertisements of a "summer-stage fitted up with Benches and Cover'd over, so that the Passengers may sit Easy and Dry," the occasion was held to be one for general congratulations. Even in that luxury it required thirty or forty hours to go from New York to Philadelphia—an obvious waste of time abhorrent to the

mind of J. Stevens. "If," said he, "this Province is to have its chance to develop, we must give it better roads and better ferries." This sentiment—which his great-grandchildren would still be echoing—he followed up by supporting every petition that begged the legislature to construct a real highway across the State. He was always urging a dip into the province's treasure-chest to widen a cowpath into a passable road or to drain some bog long infamous for miring spent horses and costing primitive truckmen long hours of lost effort. In his opinion anything to help transportation was worth doing.

Not that he was wholly altruistic; his farms were widely scattered, and he must not only reach one from the other but also get his farm products into the towns. He had still greater need of good roads for his own traveling when he planned to move in from the country; for it was at this time that he decided to buy and build in Amboy. According to the records, he chose "all that certain Lott of Land, being ten chains in length and one chain in breadth; bounded East by Water Street; North, by Michael Howden's Lott, West by the High Street, South by Peter Sonman's Lott"—that is, at the center of the growing town. The old records describe the house he built as "a first-class brick dwelling," and it was frequently the gathering-place of those interested in such notices as this one from the "American Weekly Mercury," March 23-30, 1727:

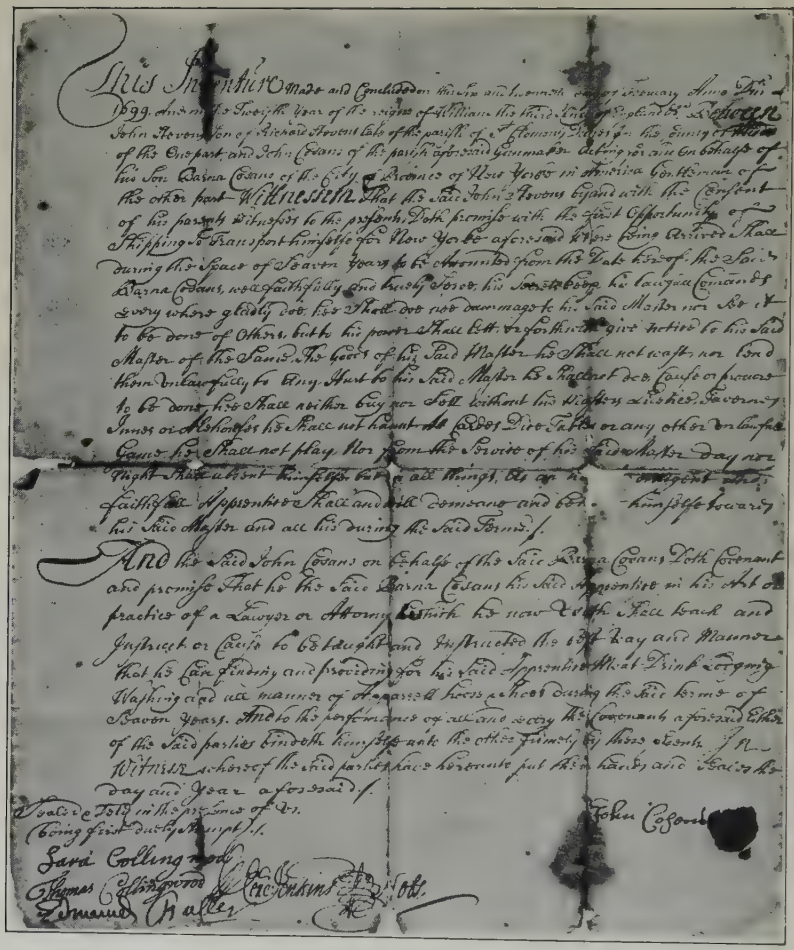
This is to give notice to all Gentlemen and others, that a Lottery is to be drawn at Mr. John Stevens in Perth Amboy, for 501£ of Silver and Gold, wrought by Simeon Souman of New York. The highest Prize consists of an Eight Square Tea-Pot, six Tea Spoons, Skimmer and Tongues, valued at 18£ 3s 6d. The lowest Prize consists of Twelve Shillings . . . 278 Prizes, only five Blanks to each Prize.

An establishment in town made him an active ally of those who were trying to build Amboy into a seaport surpassing New York, and led him inevitably into politics. From deputy collector of the port, in 1716, he rose within the year to be collector. Twice at least his early legal training was made use of in his appointment as clerk of the Chancery Court. This tribunal had been established in New Jersey in 1702 and was kept incessantly busy with litigation among settlers who found themselves, under the crown government, suddenly invested with property or dispossessed of it. His terms appear to have been served without bringing adverse criticism upon him, but he was really more inclined to other business than the law. In this inclination he was far from being alone, for the popular prejudice was suggested by Gabriel Thomas when he wrote, in his "Historical Account," "Of lawyers . . . I shall say nothing, because this country is in every way Peaceable; long may it so continue and never have occasion for their tongues, so destructive of Men's Estates!" Yet if this was J. Stevens's view, it was not shared by his posterity. Many of his descendants were to be trained for the law, and one great-great-grandson, Frederick W. Stevens, was to become noted as vice-chancellor of the State.

With the limited franchise existing in New Jersey as a province, the phrase "we, the people" meant "we, the landowners" even more certainly than when it was written into the Federal Constitution of 1787. Because J. Stevens owned land and could vote, political offices sought him out. When Perth Amboy, in 1718, was incorporated as a town, the post of chamberlain or treasurer appears to have fallen to him as a matter of course. When the parish of St. Peter's, first Protestant Episcopal church in Jersey, received a charter from George I, one of the half dozen names specifically men-

tioned was Stevens's; church and state being then so closely identified that only those in politics could expect to be wardens and vestrymen. Serving for years in these two capacities, he was constantly in St. Peter's, meeting-place of Gordons, Willocks, Alexanders, Parkers, and nearly all the other leading families of East Jersey history. Moreover, the men of those families found time—presumably out of church hours—to gather for candles and cards, or for grave debate over mulled port and negus, at the inn J. Stevens erected for their better entertainment. It naturally followed that, although never himself a member of the royal council, he should be well posted upon its deliberations and upon those of the assembly, then meeting alternately at Burlington and Amboy. The minutes for May 25, 1716, tell us that "Colonel Farmer and Mr Laurence acquainted the House that the Gentlemen of the Council had appointed to meet at one o'clock this day, at the house of Mr Stevens, to sign the Address to his Majesty"—adding that the House ordered its own members to "meet the Council at the said time and place" for the same purpose. Similarly, the memorial of Evan Drummon speaks of a "Mr Roughead at the door of John Stevens' house at Perth Amboy, while the Gentlemen of the Supreme Court were at dinner in the adjoining Room." Such august bodies never dined at any but an unstinted board, from which they let drop many crumbs of information to the profit of their host.

He was a prosperous citizen of barely sixty when he died in 1737. In his will there were a few small bequests, including one providing for repaying a one-pound debt to his "Brother William, Periwigg Maker in the Strand, London." Among his numerous children he divided great stretches of land, scattered through townships that would now form part of Middlesex, Mercer, Somerset, and Warren counties, but



THIS INDENTURE BROUGHT THE FIRST STEVENS TO AMERICA

were then all bounded by Hunterdon, the wide stretch named in honor of the best of the provincial governors. Even for so many heirs it was a great inheritance. Yet it was hardly as valuable as the unwritten, intangible legacy he left to the men and women of his line. The traits of his character he handed down were ambition coupled with vision, understanding of law combined with respect for just law, and earnest zeal for the general good of the community. He left an example of material success, of active interest in developing better government and greater commerce through improved communication between men and towns, and of fitness for public trust. The page we have of his life is not a long one, but it forms a proper preface to his family's history.

Of J. Stevens's children the eldest, Campbell, became a soldier, serving under Colonel Peter Schuyler of the "Old Jersey Blues." With his company of 101 men he embarked at Newark for Albany on August 30, 1746. Shreds of his letters and accounts show that he often found it necessary to feed and clothe that company out of his own pocket, for there was no division quartermaster with that body of rough-and-ready riflemen. In the French and Indian Wars he won honorable mention; in the intervals of peace he made the money for his soldiers out of successful business ventures with his younger brothers.

Lewis, another Stevens soldier of this generation, was an officer in a British colonial regiment, stationed variously in Antigua, St. Christopher, and elsewhere about the islands. His merchant brothers suggested that he become their commercial agent in the West Indies, a proposal to which he obtained his colonel's consent only by promising to "conduct his trading in a genteel manner." However, he tired of life in the tropics and eventually resigned from the army. Re-

ORATION
AT
HOBOKEN.

BY REQUEST,

E. THOMPSON,

(LATE OF PHILADELPHIA,)

Will deliver an ORATION Tomorrow (Sunday) Evening, at 6 o'clock, in the Grove, on the Bank of the Hudson River, about half a mile above Mr. Van Antwerp's Hotel:

SUBJECT,

American Independence.

☞ FERRIAGE of grown persons reduced from 25 to 12½ cents both ways—Children half price. No Bank Bills will be received. No Boats will be permitted to land any where on the Hoboken or Weehawken shores.

JULY 19, 1829.

George H. Evans, Printer, 40 Thompson street.

ONE OF COLONEL JOHN STEVENS'S EFFORTS TO PROMOTE HOBOKEN BY BROADCAST

turning to New Jersey, he settled down upon his Hunterdon county inheritance, a large farm known as Cornwall, in Alexandria township. The word "genteel" pursued him, for his house was described as such, standing in the center of seven hundred acres, half of it cleared and planted with "400 grafted apple trees, watered by living streams." The place was considered an "ideal country seat for a gentleman, or profitable place for a farmer, being in the neighborhood of several houses of worship, and two mills from two to four miles distant." The land for one church was a gift from Lewis himself, which earned him the title of "a gentleman of distinguished piety," and, as a practical help to the struggling parish, he persuaded his much more prosperous brother John to contribute generously. Tiny, picturesque St. Thomas's still stands upon its hilltop, not far from Pittstown. Beneath it Lewis, to quote "The Pennsylvania Packet" of May 21, 1772, was "decently interred on April 22nd last, a Gentleman whose amiable Disposition and Goodness of Heart had endeared him to all who knew him."

Richard, a third brother, was occasionally a sea-captain, frequently a real-estate operator, usually a politician, and always the first of many Stevens sportsmen. "Short in stature, red-haired, and vivacious as a Frenchman," his greatest passion was horses. He rarely missed the races then fairly numerous at Perth Amboy and at Morristown; often, to be sure, he bet sums that he could not at all afford to lose. But his love of sport was not considered in the least inconsistent with his being a pillar of the vestry of St. Peter's, nor with his being the lay delegate from the parish to diocesan conventions. He could recommend a change in the Prayer Book as easily as a change in the racing rules.

Like Lewis, Richard owned farm lands. The record of one day shows those lands threatened with the foreclosure of

a mortgage, or shows Richard himself arrested and, in the pleasant custom of the times, thrown bodily into jail for some small debt. The record of the next day tells how his brothers or his friends have made themselves his sureties, bailed him out, and promptly secured for him, either by appointment or by election, some such office as justice of the peace or representative from Hunterdon in the Provincial Congress of 1775. Down to-day, Richard would be up to-morrow.

Notwithstanding the naturally Tory tendencies of a family as English as his, he himself was always a violent Whig. When he married, in 1758, he was careful to choose, in Susannah Kearny, a wife of similar opinions in spite of her loyalist family. Her brother, Philip third, a wine merchant of Amboy, showed such strong sympathies with the crown that, in 1776, he was arrested by the local Committee of Safety. Only after considerable haranguing and many promises was Kearny's release procured, on a parole of six-mile radius from Richard Stevens's house. Yet it should be noted that very few loyalists handed down better American descendants. A son of this Philip was General Steven Watts Kearny; a grandson was Fighting Phil himself.

In certain directions Richard Stevens was not without the family progressiveness, his chief difficulty lying upon the practicable side of an idea. Thus, he proposed to extract salt from the waters about Perth Amboy in order to meet the demand for salt in New York city. But before he had perfected the process—and he never did perfect it—he had his train of wagons built and ready to carry the salt to market. Sound enough on transportation, he was rather less so on production.

With his pen he was tremendously active, usually over some freshly impending financial crisis, from which two

Johns—his brother and, later, his nephew—were called upon to rescue him. This they did so successfully that he lived until long after the Revolution, surviving all his brothers and not dying, even in the end, of old age. On a spring morning of 1802, when he was close to eighty, he hitched a half-broken colt to a gig and set off down the Burlington road. The colt bolted, capsized the gig, threw Richard out, and injured him so severely that he survived only a few hours. It was a sporting finish that must have satisfied him. Less successful, materially, than his brothers, and less distinguished in the public service, he has been affectionately handed down as "Uncle Dicky."

CHAPTER TWO

In this first American generation much the most distinct figure is the namesake, though not the eldest son, of his father. The second John stands out because to him descended the greatest share of natural Stevens astuteness, increased by good Campbell blood, and ready to be further sharpened in the colony's years of formative struggle. The next half century of Jersey history is full of instances of the public and often distinguished acts of him who became generally known as "the Honourable John Stevens, Gentleman."

During a visit of his mother's to New York City he was born there on October 21, 1716. While this accident of birthplace made him none the less a Jerseyman at heart, it did inspire him with a warm regard for New York; in token of it, as opportunity offered, he was to give her a disinterested, loyal service. As a child he lived chiefly in Amboy, depending for early education upon small schools conducted by Dutch or Swedish instructors and devoted to what were even then known as courses in business training. To glance back at such schools from our own day of mad girding for the commercial battle is to appreciate the arc through which the educational pendulum has twice swung. The classics and other "higher branches" of learning were in no great repute in 1725, while so little was made of English or of the literature of the language that, even as late as 1758, scarcely any Englishmen were to be found teaching in Jersey—such as there were, moreover, teaching only by special license from

the Bishop of London. Thus, even if J. Stevens had intended his son for anything but a mercantile life, he would have found little alternative. Yet, somewhere along that road to manhood, and perhaps actually from his father, the boy contrived to pick up enough law to be of great use in after years.

When their father died, John, at twenty-one, was already dominating the family. His was the controlling spirit under which he and his brother Campbell began the operation of a small fleet of merchantmen. It was he who fully recognized overseas commerce as a vital element in America's growth, and it was chiefly his enterprise which won the smile of fortune and made it possible from time to time to build and man another ship. Frequently, too, he sailed as master of his own vessel. At twenty-three his ship was the sloop *Martha;* two years later he took the brig *Catherine* across the Atlantic with cargoes of flour or pork and brought her back loaded to the fife-rail with casks of good old Madeira.

There was profit in wine and in spirits from the West Indian islands. He could say, "I am selling off my Rum at 3/9 the Gallon," and make money while he was saying it. But there was pleasure, and pride, too, in the calling. When he indorsed his own papers, or witnessed those of other men, there was an extra flourish in the signature "John Stevens, Mariner." The sea gave him vision and must have lent him romance, for he never forgot it. But the records, unfortunately, are made up chiefly of hard commerce, with no word of canvas crowded on or of muffled boat-landings at midnight to avoid clashes with his Majesty's collector of duties. Though there was plenty of good precedent for smuggling —John Hancock, as a ready example—no trace of this can be found in the available papers. Doubtless it was his father's earlier strictness as collector that made the mariner enter

SHIPPED by the Grace of GOD, in good Order and well-conditioned, by JOHN STEVENS, in and upon the good Brigantine called the Funchal whereof is Master, under God, for this present Voyage Fenwick Lyell and now riding at Anchor in the Harbour of Perth Amboy and by God's Grace bound for Antigua To say, Two hundred halfe bar.ls of flour Thirty bar.ls of Beef Nine bar.ls of Porke & Eight firkins of Butter on the proper Acc.ts & Risque of Mr Lewis Stevens

L S No. 1 to 200 flour
No 1 to 8 Butter

Being marked and numbred as in the Margin, and are to be delivered in the like good Order and well-conditioned, at the aforesaid Port of Antigua (the Danger of the Seas only excepted) unto Said Lewis Stevens or to his Assigns, he or they paying Freight for the said Goods four pounds ℔ Ton

with Primage and Average accustomed. *In Witness* whereof, the Master or Purser of the said Brigantine hath affirmed to three Bills of Lading, all of this Tenor and Date; the one of which three Bills being accomplished, the other two to stand void. And so God send the good Brigantine to her desired Port in Safety, *Amen*. Dated in Perth Amboy Dec.r 9. 1751.

Fenw.k Lyell

A BILL OF LADING FROM THE HONOURABLE JOHN STEVENS

and clear his ships in due form; certainly it was not want of enterprise nor lack of courage. He would take a ship anywhere, for any cargo.

Among captains who sailed for him were his brother Richard and his sister Sarah's son, Fenwick Lyell of the good brigantine *Funchal*. The latter captain came of that race which for so many years treasured, as proof of its loyalty to the Stuarts, the handkerchief caught by a Fenwick when it fell, blood-soaked, from the scaffold of Charles I. If Captain Lyell himself ever carried that handkerchief, it was ill-fated, for he was eventually lost at sea. But this was not before he had helped to fill with valuable merchandise so many Stevens warehouses that these were soon demanding all of the senior partner's attention. "I am," wrote John Stevens to a friend in 1743, "now upon settling myself in Amboy and believe I shall not go to sea again." This was at twenty-seven; less than a score of years later he would be able to retire wholly from overseas commerce and devote himself to administering the growing family estate or taking the sort of venture in land that had always attracted his father.

He was a prolific writer of letters, in which he expressed himself more easily than in speech. Men noted him among those of few words, although when he did open his mouth it appears that those about him were ready to listen. It was this quality, added to the promise he gave of a rising young citizen, that brought him the favorable notice and friendship of James Alexander.

In all Jersey he could have formed no better connection. James Alexander was a leading lawyer, a mathematician, and an astronomer of some note. He was long the surveyor-general of both New Jersey and New York, the owner of almost boundless acres, and perhaps the most powerful mem-

ber of the Society of East Jersey Proprietors. In science, as in politics and business, he was in correspondence or in direct contact with all the leading minds at home and abroad. He again became prominent as counsel for Zenger, leading the earliest fight for free speech and an uncensored press on this side of the Atlantic. His life was so full of activities and important events that an account of it, from his papers in libraries and historical societies, and especially from private sources now available, would be an almost complete history of his period. For John Stevens to become associated with such a man meant not only a broadening of education but also a definite lift along the road to prominence and fortune. Very shortly the business connection was to lead to a personal one. In 1748, finding himself in a position to marry and favorably regarded by the lady of his choice, John "took to wife" Elizabeth Alexander, the daughter of James.

Apart from any claim which her brother William may have felt he had to the Scottish earldom of Stirling in Scotland, Elizabeth Alexander Stevens had an established position of her own. She brought great property to her husband and she bound him closely to her father, but she should rather be remembered as the mother of two children. Her daughter, Mary Stevens, was to become the wife of Robert R. Livingston, the chancellor of New York State, who enters so largely into this story; her son was the man whose achievements for his country and posterity it is hoped to record in these pages—Colonel John Stevens, the third of his name.

His father's part in preparing the way for a greater son was vigorously played. Becoming the confidential agent of James Alexander, the Honourable John formed a partnership with his brother-in-law William, not yet the self-belted

earl but still a plain man of business. The enterprises in which these two engaged furnished them with material for a great sheaf of correspondence. In it are to be found comments upon all the happenings of the day and many glimpses of Jersey commercial methods and the difficulties to be encountered in the pursuit of them. Pirates, or privateers, for example.

In the spring of 1748 the Honourable John had a ship ready to sail, but William Alexander declined to take a share in her. True, he had no funds available at the moment; but these he could have raised had he not had, as he wrote, "certain intelligence of Don Pedro being near the Capes, and that many of the enemy's privateers design to be on the coast in a short time, which must make trade dangerous." Notwithstanding this warning, Stevens sent out his ship and, happily, she escaped the fate predicted for her. Indeed, trade so flourished all through this year that Stevens, always reaching out for new markets, could write Alexander in the winter:

> Our brig sails for Antigua in ab't 3 weeks. I am loading her with a New England cargo of Lumber, Boards, Shingles, House Scantlings, and Staves.

Of course, it was the duty of Brother Lewis, in Antigua, to lay aside his regimental duties long enough to dispose of this cargo in a genteel but none the less advantageous manner.

Politics was naturally an absorbing topic of the letters between the partners, both then holding the Tory opinion proper to their positions in the provincial world.

"I am," wrote the Honourable John early in 1749, "much engaged in parliament'g [electioneering] which I am not fond of and which I should not [have] engaged in had not

a quaker been set up—the only one in our town. I think that set of people would snatch at power of which they have too much already!" A few days later he reported that he was "much press't to stand but my business will not permit me to attend the Assembly at present"—an excuse which was not long to prevent his being "press't," to an extent which overcame his reluctance, into public life.

No formal announcement of the birth of the son remains in existence. In midsummer of 1749 the Honourable John began writing to the family about "young Johnny," reporting that "our little son has been much out of order for two days but is now something better." This was very soon after the boy had been born in New York city, but not before it had been decided for him that he should be a true Jerseyman.

Only now and then does Johnny appear in the letters of his father. Usually, he was mentioned casually in the middle or at the end of a paragraph to William Alexander, such as "I rec'd yours the Day before yesterday with Ten small Negro boys and girls, and agreeable to your Desire, I will dispose of them as soon as I can, and I think the sooner the better, as we shall soon have cool weather. Two of the Negroes came here sick; one of them is Better. Young Johnny is well." And, soon afterward, the next letter says nothing of the baby though it does report: "Sold 9 negroes for £324," and thus intimates that the tenth never did recover.

Similarly, as time passed, the Honourable John would write his European agent, Robert Scott:

> I have a new vessel called the "Funchal" which I built for the Madeira trade but fear now I shall be obliged to employ her in some other. Am favored with a line Acquainting me that they will send back with no wines, which I much approve.

I hope other Houses will do the same, which will be the only way of bringing down the price and restoring the trade. I am pleased to hear you have a little prattling family, which is a pleasure I have not arrived to yet. I have been married about two years & have one Boy but too young yet to prattle.

Stirling—to give him at once his later and more familiar name—had similar habits. In the midst of a long and tedious business letter he would write "My daught. desires her compliments to your son & says if it was not Contrary to the rules of decency for her to begin first, she would write him a letter." The daughter was then only two years old. Otherwise, if she inherited the taste of her father and uncle, even the rule of decency would scarcely have made her forego a chance to take up the pen.

Between the two families—Alexanders usually in New York and Stevens' almost continuously in Amboy—there was a constant exchange of the small luxuries of life. "My wife," the Honourable John would write, "sends her Mama some limes and some plums, and thanks her for the Anchovies, Walnuts, and Biskets," or "sends four Colly Flowers of her own raising." Once there went forward from Jersey a "Mocking Bird, which is the finest I ever saw. His food is the tenderest part of Raw Veal, cut into small pieces and put into the smallest Troff; at the other end of which, put Milk. The big Troff is for Indian Meals, or soak'd Bread, and I wish him safe to hand." Again, Stirling was asked to send "something proper, in green or Blew, with linding, to cloth two wenches, a man, & a Boy—with as much flannen as will make your little nephew two petticoats."

Governor Jonathan Belcher of Jersey relied upon the Honourable John for help in furnishing the mansion. At one moment the governor wanted "One Coach Wipp and

a pa. Steele snuffers," at another he needed "an earthen teapott, and a pr. Brass Candlesticks"; all these, of course, to be procured from the already superior New York shops. Such luxuries were scarce in an Amboy which had not realized the hopes of its founders. According to Burnaby, the traveler, the town could then claim only "One hundred houses, with barracks for 300." Still, the same authority describes the Honourable John's neighbors as "hospitable, and far more liberal than the Pennsylvanians," suggesting an explanation of their being able to shop in the metropolis when he adds that "their paper curency is at 70 per cent, preferred by New Yorkers to their own."

It was not all plain sailing for the Honourable John. At the very moment when he was building a new ship "to cost not less than 2000 pounds," he would have to write to Stirling for help in a "most unfortunate incident":

Combe, Monday, Feb'y 18, 1750.

A brig of mine arrived yesterday from Teneriffe and, in passing the man-o'-war at the Hook, the latter fired several shots at her. The seamen supposed they wanted to press, therefore were so resolute as not to suffer the Captain to Bring-too. Two Boats were sent after Her, the wind lulling; they came up with her and took away one of her men—William Freeman. I beg you will apply to Captain Roddam & endeavor to have the man cleared. The seamen meant nothing more in what they did than to save themselves from being press't.

Although press-gangs threatened his crews now and then, and although the wine trade sometimes flagged, the Honourable John had no lack of suggestions for new enterprises. Not all of these, to be sure, were accepted. Thus, one Thomas Crowell wrote him from Antigua, in 1751:

Sir, as I formerly sail'd in your Employ and by misfortune forfieted your favours I hope you will not forget the old proverb

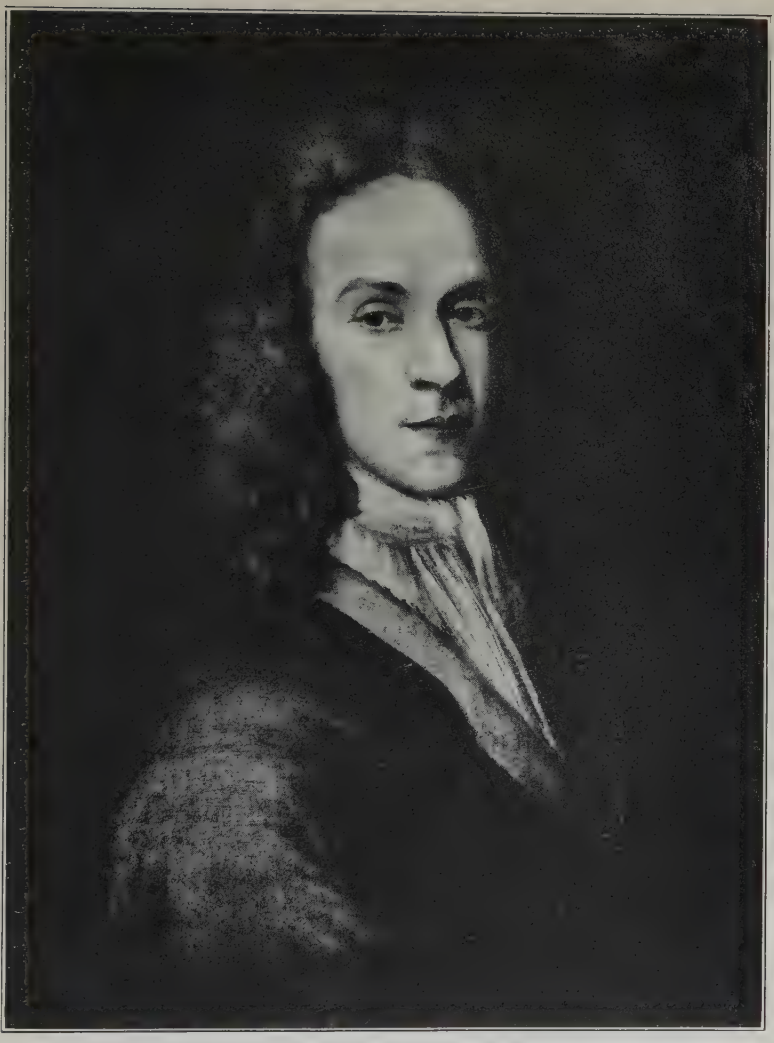
that is forget and forgive; it may be a Satisfaction to you to hear Somthing of our Voyage, we left the coast of guinea the 27th of Nov'r last with 52 Slaves on board besides privileges. We arrived here ye 20th Jan. 1750/51 with the loss of but one Slave and came to good markets with them, and are all sold but a few small ones. I purchased two fine young girls of about 12 or 14 years with what small ventures I had which was rum.

I hope Sir that if you should be concerned in that branch of trade I shall be heartyly willing to serve you in any Station above a Comon Sailor, So as to reprieve the Loss you sustained by me; and if it should happen that you should have a Vessel in the African trade I hope you will remember me once more for I should take the greatest pains in Life to serve you with Double Diligence; and I think if you had a small Vessel in that trade it would suit you, as you have had a small run in selling of Slaves of late. And you would find it much more profitable than to carie them from thence.

In spite of this interesting invitation, the Honourable John did not become a "blackbirder." More legitimate trading, afloat and ashore, appears to have sufficed to keep him fully and, upon the whole, profitably occupied. Frequently, this trading carried him to New York for protracted visits. While upon one of these, in 1752, he learned from Thomas Bartow, another associate in Perth Amboy, that "I just now saw your son. He is very well and your Sister says he is as well satisfied as if he had always lived with her; and she says Dick desired you would send down the wheels of the Chair that he may bring it up with him." Dick, who needed the chair's wheels, was red-headed Richard, to whom the care of little Johnny was often intrusted when his father and mother left home—Richard keeping a most exacting account of every penny laid out in Johnny's behalf. However, the Honourable John could afford to be liberal, for his property holdings were constantly increasing in value. Within the loosely bounded

limits of Hunterdon, Stevens holdings dotted the map from the Assanpink Creek at Trenton to where Port Jervis now stands. They included the Rocky Hill copper mine, which the Honourable John's father had finally acquired in realization of the dream that first brought him to Jersey, though this appears to have been rather sentiment than investment. After one inspection of the works the Honourable John wrote that they had "got, out of several pits five or six feet deep, about 100 weight of sollid Oar, some of it mixed with a little Virgin Copper." But mining never proved as profitable for him as land-owning, particularly after his share of James Alexander's estate made his an enormous belt of Jersey territory. It has since been broken up into dozens of towns, hundreds of farms, and thousands of small freeholds; Stevens-Alexander deeds are the most numerous in all Jersey title history.

Political events, notably the land riots just then arousing the anger of governor and Proprietors, deeply interested the Honourable John. "The Germans," he wrote Stirling, "seem to be confoundedly frightened and I hope will be good subjects for the future. What we have done, in getting those concerned in the Riot of Feb. last indicted at the Circuit Court at Trenton, will, I believe, have a great effect on the Rioters." Interest of this sort pushed him more and more into public life until, in 1751, his friends insisted upon his standing for the assembly. He consented under protest; but, being elected, he determined to be active. An infrequent debater, by the records, he appears to have been a sound one if judged by the conservative British standards which were naturally his. Before long his eyes were wide open to the colony's position, both in relation to Britain and in respect of the growing friction between Britain and France. The assembly's minutes on questions of



JOHN STEVENS, FOUNDER OF THE FAMILY IN AMERICA

preparedness for defense show him always voting for more troops, with more money to feed, clothe, and pay them. With Johnston he formed the committee that waited upon Governors Hardy of New York and Morris of Pennsylvania to discuss means for protecting the frontiers against Indian depredations. When the building of block-houses was decided upon he personally superintended much of this work at Drake's fort, Normenach, and Phillipsburg, while his further recommendations are set forth in a letter to James Alexander, October 28, 1755.

The Indians have made so great a progress in the province of Pennsylvania, in their design of driveing us all into the sea, and are dayly expected over into this, that I must put off my business till a more favourable Opportunity; having undertaken with Mr John Johnston (as I think it all our Duty's, as well as interest, in time to endeavour to prevent the like Calamities in this province that our neighbours have suffered) to go up to the frontier in order to build blockhouses and to endeavour to put our Forces there in such a way as to be able to keep off the enemy. That we [may] not rest under the security of having two hundred and fifty men on our Frontier, and perhaps not one of them properly acquipt to make any stand against the enemy. And it's like[ly] many of them are not able-bodyed.

As the Assembly have given the soldiers great pay (two shill.s proct. a day) we intend to see that they are all men fitted for the purpose (as the high wages, I doubt not, will give us an Opportunity of chusing such) and that they have each a good Musket & Cattouch Box with a sufficient number of Carterages (of which, I suppose, at present there's not one among them).

If we can get our soldiers in this order while we are there, the Commanding Officer, having strict instructions, may keep them in the like & if so I think we shall be defended at least against the incursions of the Indians. Inclosed is a copy of the

present instructions to the Commanding Officer, to which I think there may be some good additions.

In 1756 he became paymaster of the Jersey Blues, his brother Campbell's regiment, and in this office he continued for some years. At heart he was not really unfriendly to the Indians, and for this reason he was appointed, in 1758, to the commission which included Richard Salter, Charles Read, William Foster, Andrew Johnston, and Jacob Spicer. These gentlemen were directed to negotiate an Indian treaty —probably the most important event of Governor Bernard's administration. Months of talk were necessary; endless powwows were held with Teedyescunk, king of the Delawares, Hopayock of the Susquehannas, and other chieftains, before a satisfactory agreement could finally be reached at Easton, Pennsylvania. Very carefully the Honourable John followed these discussions; just as carefully he preserved his copy of the commission's final report.

For several years Mrs. Stevens had not found, in her occasional visits to New York, enough of diversion to prevent her being rather bored by the monotony of country life. She had persuaded her husband to say to the Alexanders: "If the Axtell's House should be sold for much less than its value (as I imagine it will) (my wife being desirous we should have a House in Town) I should be glad to get the refusal of it." But Mrs. Alexander had expressed the opinion that the Axtell family "would be affronted, even to ask about it," and nothing had come of the idea—somewhat to the relief of the Honourable John, who was extremely busy in Amboy and not anxious to quit it.

However, by 1760, Mrs. Stevens had succeeded. Winter quarters for the family were secured by the purchase of No. 7 Broadway. Appropriately enough, the site is now

covered by huge steamship offices, but the Stevens house was one of that block of four which is to be seen in every print of Bowling Green as it once was. The Kennedy mansion, later the home of Washington, began the block; Richard Watts was at No. 3, with the Van Cortlandts next to him and the Livingstons, beyond, at No. 9. From the sidewalks, if not from the very windows of the house, most of the city's sixteen thousand inhabitants could be seen walking along those crooked winding streets about Battery Park—narrow but well-paved streets "adding much to the decency and cleanness of the place and the advantage of carriage." Mrs. Stevens, in this environment, could be sure of missing nothing of the gaieties of the metropolis. It was gay, too, in that time when richness of dress, with variety of color and excess of frill and furbelow, was just reaching its most extravagant point in American history.

In his combination day-book and diary the Honourable John made note of the steps taken to cut down the country establishment in favor of the one in town. "I sent the old wench Dinah to Bloomfield," he wrote, "at 12 pounds currency per annum. In case she should be confined to her bed I am to pay something more; & I bid Marcus tell Bloomfield's wench that, if she took good care of old Dinah, I would give her a PC. of 8/8." Besides such pleasantly piratical flavoring as pieces-of-eight, other bits can be gleaned from the record thus kept for over thirty years. Events of state importance were slipped in between careful counts of the Stevens horses, cattle, and hogs, or between details of transactions on behalf of the Society of Proprietors, in which the Honourable John became increasingly prominent. Occasionally there is a word or two of Johnny, such as Uncle Dicky's statement of account. At eleven, Johnny was living with Richard in order to attend Kenersley's Col-

lege near Woodbridge, where five months' tuition cost the great sum of "two pounds, five and six." His father paid the two years' total of some sixty-seven pounds without protesting even such an item against Johnny as "To 2 tickets in Dunlap's Lottery for him and Polly, £1 10d." Possibly it was Johnny's failure to win the grand prize at this tender age that made him write, years afterward: "I have never been a betting man!" But he was one. Like Pierpont Morgan, he was an inveterate bettor upon the future of America.

Establishing a New York house involved the Honourable John in many journeys between that city and Amboy, thus affording him first-hand knowledge of the generally poor condition of Jersey roads. He was, at about this time, one of the road commissioners and he appears to have been, with James Parker, the most active member of that body. It was these two who submitted the report, "for themselves and in behalf of the other commissioners":

> We the Commissioners appointed by Law to make Surveys and to Report to the General Assembly the Practicability of laying out strait Roads through certain Parts of the Province of New Jersey and for establishing a Lottery to defray the Expence of the same, Beg leave to inform his Excellency the Governor, His Majesty's Council, and the Honourable House of Assembly THAT agreeable to said Law, Books for the Lottery were printed and a considerable Number of Ticketts disposed of in this and the neighboring Colonys. That surveyors and Chain bearers were employed in surveying Some Part of the Roads by which an Expence hath been accrued and no fund but the Lottery to pay the same.
>
> WE THEREFORE Humbly Propose (As a Method Least Detrimental to Individnals to free the Province of any Expence and to support its credit on that Account) That the said Lottery should be drawn as soon as the remainder of the Ticketts can be disposed of; And so much of the monies aris-

ing therefrom as will be sufficient to pay the Charges of the Lottery be applied to that Purpose, and the Residue to be laid out, one-half thereof in the Improvement of the Road from the City of Burlington to the Ferry House opposite to Perth Amboy, and the other half, after deducting the Expence of Surveying aforesaid, to be laid out in the Improvement of the Road from Elizabeth Town to New Brunswick and from thence to Trenton; and that a supplementary Act to the former Lottery Act be passed to Restrain the Commissioners from straitning said Roads but in such Parts thereof as the owners of the Land through which they pass shall consent. And pray that leave may be given for a Bill to be brought in for that Purpose.

The report is typical of the then prevailing method of paying for public works, not through taxes but through an appeal to the ordinary human desire to get something for nothing. When the grand prize and the lesser prizes had been paid, it would be possible to think of spending some money on the roads themselves! Another feature which would be unfamiliar to-day is the provision for restraining the commissioners, at their own request, instead of restraining the property-owners. To our present purpose the report shows how intimately the Honourable John, like his father, and more particularly like his son not many years afterward, was concerned with the communication between Trenton, Burlington, and New Brunswick.

On June 9, 1763, the Honourable John was appointed to the council of Governor Bernard, an office in which he remained active until that body had held its last meeting under Governor William Franklin, the son of Benjamin Franklin, who cherished opinions differing so widely from those of his more distinguished father. A thorough-going royalist, Franklin's only concessions to the colonials were made with the object of preserving peace. His efforts in

that direction appear to have consisted largely in ordering impressive social functions, at which class distinctions were not very definitely drawn. From attendance at these functions the general world of Jersey was expected to absorb a strong feeling of loyalty to the crown.

The Honourable John, of course, was born a Tory. Disapproving war against the crown, he supported the governor in every honest attempt to avoid it. Consequently, Franklin liked him, dined now and then at his house, and frequently made use of him in the negotiations between colonies. Thus, when he wrote to Governor Colden of New York, in the winter of 1763/64, Franklin said, in part:

> An Act being passed in this Province for raising a Number of Troops (not exceeding 600) for the King's Service, in Proportion to what the Colony of New York has raised, or may raise, I must desire the Favour of you to certify to me what Number you have now in the Pay of your Government. . . . The Honourable John Stevens, Esqr., one of the Council of this Province, will present you this Letter, and I should be glad you would deliver to him the certificate above mentioned.

However, the governor could never persuade his councilor to go beyond a certain distance with him along the road that led to completely submerging the colonists into mere crown subjects. Ten years before the Revolution there was a very definite point at which the term "American" took on distinct meaning for the Honourable John. Loyalty was one thing; submission to oppression was quite another. When despotism reared its ugly head he struck at it, as witness his firm stand in the council against any undue extension of the right of search. He stoutly maintained that an American's home, if not to be classed as a castle, was at least its master's own and therefore inviolate, except under

all due process of law. What we now so often recall as the Fourth Amendment to the Constitution was a hard-held tenet of the Honourable John's.

He was in New York during that early fall of 1765 when indignation against the Stamp Act was rapidly rising to the boiling point. He, too, resented the stamps, but his was among the cooler heads in town. With some knowledge of mob-psychology as well as with an inherent horror of unnecessary violence and bloodshed, he looked out from his Broadway window upon the crowds milling around the soapbox orators and agitators. He discussed the whole situation with Judge Livingston—"Gentle Robert," as the chancellor's noted father was so often called—with John Cruger, the mayor, and with Beverley Robinson, men whose names were known to every New Yorker. It was these four who waited upon Colden to insist that no stamps be issued and to guarantee, in return, that there should be no further rioting. Colden being wise enough to yield, a "broadcast" notice was nailed to every prominent tree and every board fence. For the moment, at least, debate replaced open street-fighting.

"*Except they should have other cause for complaint.*" It is almost possible to assert that it was the Honourable John who wrote that reservation into the broadcast, for the phrase exactly expresses his attitude. In Jersey council and out of it, as the great quarrel grew sharper, he leaned more and more toward the colonial side. Indeed, as time passed, that council came to include what Franklin in his letters calls "the unruly three"—John Stevens, Lord Stirling, and Richard Stockton. To the very end, honorable peace between Britain and the colonies was, by these three, held as highly to be desired; from the start, peace at any price was anathema. Any particular grievance being

removed, they were content to treat as amicably as before —*except they should have other cause for complaint!*

Young "Johnny," then about seventeen, was enrolled, for his further education, in King's College. To provide for him, and give him a home when the family should be out of the city, his father selected a dependable friend. The Honourable John's journal gives us this enlightening entry:

Dec. 12, 1767. I gave Mr. Jas. Duane £100 . . . in part of £200 I agreed to give him with my son John, who is to stay with Mr. Duane till he is 21 years of age. Dec. 29th, pd. Mr. Duane £100 more, in full.

Johnny's own impressions, of what easy and rapid transportation may mean, must have become fixed at about this period, never to be forgotten. One letter of his was written when his father, at Burlington, in council, had given him certain commissions to execute.

New York, September 15th.

Honour'd Sir:

I received your letter yesterday afternoon and was for some time puzzled to find out the meaning of your desiring me to let you know whether I had heard anything of Uncle Lewis. But, upon looking at the date, I soon unravelled the mystery; tho' I must confess, I was a little chagreened to find it contained nothing new, as I have seen you since.

I got to Amboy about four o'clock that afternoon and the next day, meeting with no opportunity of going, Aunt Sarah and I waited upon Mr. Parker for dinner; where, upon considering the matter, they were all of opinion that, since Tomson was not to go till Tuesday, and since the house was but poorly guarded against the many accidents that might happen, the surest and most expeditious way was to hire a chair at the ferry. Accordingly, the next morning, I went over and, after waiting two hours, till they had pack'd & secured every-

thing as well as they possibly could, I was furnished with a chair, which, for antiquity, I may safely say might vye with anything in the country. However, crazy and old as it was, I had the good fortune to escape shipwreck and arrived about twelve o'clock at Watson's. As there was no boat there at that time, I was obliged to walk to Duglases. Where I dined and waited until after six in expectation of more passengers, but as nobody came, I chose rather to pay the fare myself, than stay all night from home.

As it was dark before I got home, and no candles in the house, it was some time before I could gain admittance; but, after repeatedly knocking, Scyphax had resolution enough to bellow out "Who's there?" It gave me great satisfaction to find everything was right and no mischief had happened. . . .

Your ever dutiful and most obedient son,

John Stevens.

"Scyphax" can be identified vaguely as a family servant; "Tomson," who was "not to go till Tuesday," is a mystery. Aunt Sarah, however, was the sister of the Honourable John, who divided her life between the homes of her several brothers. It was John, as a rule, who cared for her; up to the time when, as he put it, "Almighty God was pleased to put an end to her life," May 26, 1790, his journal carries entries which enumerate the exact number of months and days she spent with him, between those occasions when "my Brother Richard came in his light waggon" to "fetch her" one way or the other.

Occasionally Aunt Sarah accompanied her brothers to a tea-drinking or a dinner; but more often it was to Mrs. John Stevens that there fell the major part of representing the family in society. It was, of course, necessary that Mrs. Stevens should hold her own with the other women of the day, in dress. Even upon this point the journal is able to help us, for we find toward Christmas time of 1767 that

"Mrs. Stevens begs leave to give Capt. Kennedy the trouble of bringing her the following things from London":

A patern for a Brocade Neglige
Broad Brussels lace for Ruffles, Tucker, and Ruff
A fashionable Necklace and Earings (not past[e])
Stomagher & Bows to suit the Neglige
A hansom fan.

The £47 15s 6d which the Honourable John entered as paid to Captain Kennedy did not include the last two items on the list. Apparently, the gallant but unlucky captain could find no "Stomagher" suitable to the "Neglige" he brought home, nor anything sufficiently handsome in the way of fans. As to what Mrs. Stevens, in her disappointment, may have found to console her, the journal is regrettably silent.

CHAPTER THREE

The family event of 1768 was young Johnny's graduation. His letters and papers say nothing of his college life or study, but "The New York Gazette and Weekly Mercury" of May 23 carried this notice of King's College:

> On Tuesday, last week, was held our annual COMMENCEMENT in St. Paul's Chapel, in this city; when, after the usual exercises, which were highly applauded by a numerous and polite Audience, the PRESIDENT conferred Degrees upon the following Gentlemen:
>
> Benjamin Moore, Gouverneur Morris, John Stevens, Gulien Verplanck, James Ludlow, Charles Doughty, Peter Van Schaak B.A.
>
> Rev. John Beardsley, Robert R. Livingston M.A.
>
> Two silver medals were presented to Messrs Morris and Moore.

In length that list of graduates would be completely lost in the columns of names connected with a modern Columbia University commencement. Yet there were some good New Yorkers represented. Ludlow and Moore, for instance; or Verplanck, who was one of the charter founders of the famous old Tontine Coffee House, gathering place of business men and bloods. More immediately to be connected with Colonel John Stevens was Gouverneur Morris—first as personal friend but later, when canal commissioner, really a stumbling-block in Stevens's progress. Again, the Robert Livingston who here received his M.A. degree was not only Stevens's prospective brother-in-law but also the future

member of the committee that drafted the Declaration of Independence, a framer of the constitution of New York, and ultimately chancellor of his State. What the class of '68 lacked in size it made up in quality.

Law being a part of every gentleman's equipment, Johnny's studies next turned in that direction and secured for him, three years later, an appointment as practising attorney from Admiral Sir William Tryon, royal governor of New York. That it should have been politics, however, rather than law that aroused his interest is easily explained by his family connection. In addition to his own sister Mary's engagement to Robert Livingston, his mother's sister had married Peter van Brugh Livingston, whose whole family was immersed in politics. Livingston influence, represented in the assembly, in the council, and on the bench, was felt in every corner of New York and naturally had the support of the Honourable John. Hence he and Johnny were much chagrined by the setback encountered by the Livingstons at the elections of 1769.

Sir Henry Moore, then governor, had dissolved the assembly in order, as he supposed, to give his own Republican party a chance to recover lost seats. But the opposite happened; more seats were lost than won, and Moore himself went down, to be succeeded by that rigid churchman, Colden. The Livingstons, who might have gone in with the church party, declined to do this. In the final count, they ran "Phil. Livingston, 666 votes; P. V. B. Livingston, 535"—neither good enough to win against Cruger, De Lancey, and the rest of the opposition. In reporting this disappointment to Stirling the Honourable John added:

> I am sorry that our Friends . . . have thus injured their Interest in this town. . . . Great pains have been taken to

prevail with Mr. Philip Livingston to joyn the three old Members—which, if he had have done, it is generally believed there would have been no poll. All the complim't was paid him by what is called the Church party that he could have wished or desired. . . . His friends are exceeding sorry he should so mismanage the best interest any man ever had.

Histories galore have dealt with the political fortunes of this famous family. Chief importance here lies in the fact that its weight was first used in the interest of John Stevens and later used very much against it by preventing the real progress of steam navigation in the United States.

The normal activity of the Stevens family in politics was mainly confined to Jersey, where the Honourable John soon found himself drawn into the dispute over the true boundary line between that State and New York. He had been expecting this, for he had long before written James Alexander, requesting "anything that is published relating to the Division Line" as first drawn. "I want," he added, "from page 31 to 47 of Jersey. I have page 1 to 22 of York, and whether there is any more or not I cannot tell. I should be glad to fight for this line with my head as well as otherwise." He was now to have his chance, as his journal for the year shows.

Being appointed one of the agents on the part of New Jersey, & the 18th July being fixed by the Commissioners, I accordingly set out for N. York the 15th, by way of Amboy. Mr Parker & I went up the next day to where we met with Lord Stirling and Mr D. Ogden. And the 17th we went over to N. York where, the next day being the 18th as above, we entered on the business of the Line, on which I attended till the Commissioners gave their Decree, which was on Saturday, the 7th October. I stay'd with Mr Parker and Mr Rutherford at York till the 9th at noon, writing letters to our agent & others in London on the subject of an Appeal.

I got home the 10th in the afternoon; to which time, from the 15th July, being 87 days I was attending on this business, except about eight days' absence at different times at my Ferry at S. Amboy. My expences to & from New York, & my horse keeping at Paule's Hook (I wrode him to Bergen & Sussex) I charge the Proprietors of E. New Jersey.

Walter Rutherfurd made the commission two thirds a family affair, for his wife was also a daughter of James Alexander. However, Parker was in full agreement with the other two when they finally reported themselves as "conceiving they have fully supported their claim and shown that a Line, from the Latitude of Forty-one Degrees on Hudson's River to Forty-one Degrees and Forty Minutes on the Northernmost Branch of Delaware River, is the true Boundary and Partition between the two Provinces." Unfortunately for their own State, they did not win. The actual line, since some subsequent modifications, now runs from 41 on the Hudson to the junction, at 41.27, of the Delaware and the Mahackamack—a loss to Jersey of many square miles which her original commissioners tried to save for her. Because of the months required to send appeals and arguments on both sides back and forth across the Atlantic, the Honourable John's draft of the final action was not drawn up until November, 1774.

We, William Wickham & Samuel Gale, two of the commissioners, and John Stevens and Walter Rutherfurd, two others, do hereby certify that we have ascertained and marked the Partition Line so that it may be sufficiently known and distinguished.

That the Rock on the west side of Hudson's River, marked by the Surveyors in the latitude of 41 deg., we have marked with a straight line throughout its surface passing through

the place marked by the said Surveyors, and with the following words and figures: "Latitude 41 North" and, on the south side thereof the words "New Jersey" & on the north side thereof the words "New York."

That we have marked Trees standing on the said Line with a Blaze of five notches. And that we have erected stone monuments at one mile distance from each other along the said Line; except the monument Number Twenty-six which, by reason of the Long Pond, we were obliged to place one chain further from the station on Hudson's River.

(To my attendance on running the line, 17 days at 30/proc. per day—the same that was allowed in the year 1769)

During these visits to New York the Honourable John was very often to be found with his social club, which in summer met at Kip's Bay and in winter at Sam Fraunce's tavern. John Moore, the loyalist, who carefully noted the politics of each club member just before the Revolution, wrote the Honourable John down as "disaffected." Toward many of the crown practices, so he was, even in 1770. But at that time he still favored crown rule in the colonies, as appears from his views on the Chancery Court, given at Governor Franklin's request:

I am of the opinion that a Court of Chancery in this Province is requisite, and that it ought to be kept open; but that, at this time and ever since the year 1713, the Court has not been held on a proper establishment.

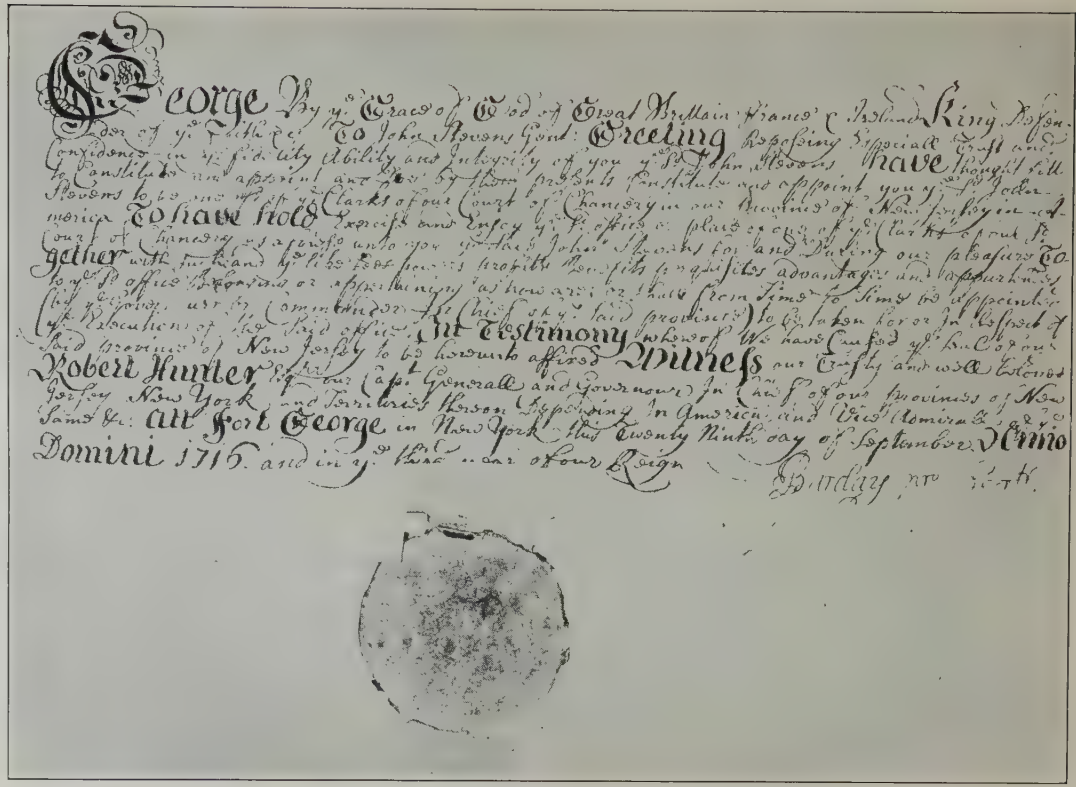
As no other ordinance for erecting said Court, or qualification of the several of the Chancellors, appears, I therefore with submission advise that the Governor and Council do form an ordinance for the establishment of the Court of Chancery; to consist of His Excellency the Governor with such of the

Council or others as shall be thought proper and fitting for the Trust; and that all shall take the necessary qualifications for the due discharge of their duty. And, that every step may be taken to give authority and permanence to the Court, I would propose that a full state[ment] of the Court of Chancery, as to the manner in which it has been from time to time held, be made out and transmitted to our Most Gracious Majesty, for his further instructions with regard to his will and pleasure therein.

Burlington, March 26th, 1770.

The Honourable John had some cause to be dissatisfied with this court, for to this period belongs the beginning of that noted case in Jersey Chancery "John Hunt against the Devisees of James Alexander, and Others." Hunt claimed wide acres in and about Elizabeth Town as part of the original holdings of one Hugh Hartshorne of the earliest East Jersey Proprietors. Parker, Stirling, the Honourable John, and a long list of defendants insisted that all these lands had long before passed by open sale to Peter Sonman, that other old Proprietor whose Amboy "Lott" formed the southern boundary of Mr. J. Stevens's first property in the town. Because "the Honourable John Stevens had wrote him to the purpose," Parker engaged "Mr Chew of Philadelphia" as leading counsel, and with an array of equally brilliant legal minds on both sides the case soon bade fair to rival *Jarndyce and Jarndyce*. Although the main issue was finally settled, shreds of side issues still hang from Jersey court records. But the Honourable John, in the course of this wearisome litigation, at least gained the reputation of being "courteous and refined in deportment!"

A more cheerful incident of 1771 was the marriage of



George By ye Grace of God of Great Britain France & Ireland King Defender of ye Faith &c To John Stevens Gent: Greeting Reposing Especiall Trust and Confidence in ye fidelity Ability and Integrity of you ye Sd John Stevens have thought fitt to Constitute and appoint and for by these presents Constitute and appoint you ye Sd John Stevens to be one of ye Clarks of our Court of Chancery in our Province of New Jersey in America To have hold Exercise and Enjoy ye Sd office or place of one of ye Clarks of our Sd Court of Chancery as aforesaid unto you ye Sd John Stevens for and During our pleasure Together with such and ye like fees powers profits Benefits perquisites advantages and appurtenances to ye Sd office Belonging or appertaining as now are or shall from Time to Time be appointed by ye Governor or Commander in Chief of ye said province to be taken for or in Respect of ye Execution of the Said office In Testimony whereof We have Caused ye Seal of our Said Province of New Jersey to be hereunto affixed Witness our Trusty and well Beloved Robert Hunter Esqr our Capt Generall and Governour in Chief of our Provinces of New Jersey New York and Territories thereon Depending in America and Vice Admirall of ye Same &c: At Fort George in New York this Twenty Ninth day of September Anno Domini 1716. and in ye third year of our Reign

Barclay pro Secrt.

MR. J. STEVENS APPOINTED CHANCERY CLERK

Mary Stevens—the Polly for whom her Uncle Richard bought the lottery ticket—to Robert R. Livingston, Jr., heir to beautiful Clermont on the Hudson. Determined that Polly should lack nothing in the appointments of her house in town, the Honourable John proposed to furnish this for her. The full details of his present, as set down in his journal, give an excellent picture of a "proper Interior," as then demanded by fashion. There are such items as "A Wilton Carpet, Bought of G. Duyckinck, 2 Callico window Curtains & making, with 2 Honiton Ditto: A Mahogany Save-All, a large looking-glass (with fraim) as well as a Suite of Red Silk Curtains with a Mahogany Bedstead; Blankets, Chimney Branches, and Damask Knapkins." At the foot of a long column were added "Two Negro Girls, at £100 Proct. is £106 4s, York," and then, as happy afterthought, there was "A Case of Artificial Flowers." Polly Livingston should lack in nothing obtainable, though it take all of 531 pounds sterling to make certain of that.

Events like family weddings must just then have been peculiarly welcome as a change from public affairs. Day by day, the part of a member of the Jersey council was becoming increasingly difficult to play. Franklin was more than ever pig-headedly against any concessions to the citizens; the assembly was just as obstinate in nursing its growing list of grievances and in blocking the governor by declining to vote him the money he demanded. Standing between the two, the council received from both sides the battering that is the common lot of all buffers. To dine with the governor, and still agree with the assembly upon many issues, called for the most delicate diplomacy.

Peace—a decent, respectable peace—was still earnestly sought by the Honourable John. Appreciating the colonists' side of the quarrel, he could not hear, unmoved, the vio-

lent Tory sentiments of some of his friends. On the other hand, he had an equal number of friends who were as fiery as Charles Carroll, with his "Stop *writing* Parliament and give it bayonets!" Presently, the Honourable John could scarcely attend the most formal business meeting, or go to the most casual social affair, without becoming involved in acrimonious discussion. To avoid this he decided to withdraw almost wholly into the country, to an estate inherited from Alexander.

This was a spot as picturesque as any other in the Jersey hills—Round Valley, near Lebanon. There he built a house which stood for a hundred years as a landmark and was then torn down to give its foundations to a modern atrocity. To-day's tenant is a Russian Pole who has no thought to spare to tradition. His mongrel hens scratch in stubble that was once a widespread lawn; and his interest in the little river that bends and twists through those green old acres is limited to wondering whether he can make of it a public swimming-pool. In the memory of the very grayest beard of the country-side, the name of John Stevens has faded to a dim shadow.

As a rule, the family in residence just before the Revolution rarely included young Johnny. He was for the active life of town and for travel, in both of which his father encouraged him. Every opportunity was seized to send Johnny upon such missions as that of aide to Governor Franklin when the latter, in 1773, visited Albany to confer upon the colonial situation with the governor of New York. Of such journeys the father's day-book tells us that Johnny, against his expenses, received "18 half Johans, at 64s. N. Y. currency, is £57 12s, and also £17. Of this total, he spent £70 7s 6d, to pay for a Sulkey, Rivington for Books, Cutts, etc." Johnny's later interest in amassing an extensive

library grew out of his spending much time and money in the shop of the noted printer; and his belief in the power of the press was largely due to constant reading of the famous "Gazette."

However, even Lebanon was not entirely out of the world. Friends and relatives would not allow the Honourable John to escape, in his pleasant hills, either fresh demands upon him or the mounting stream of political news. They haled him out, for instance, to attend the New Brunswick convention of 1774, where he and Uncle Dicky were lay delegates who helped to consolidate the Episcopal church in America. And he had hardly got home again before Walter Rutherfurd was writing him upon other matters:

New York, New Year's Day, 1775.

While you enjoy peace and Tranquility in your Retreat, we are disturbed here with continual alarms. News from the different Provinces, of wild and impractical schemes, or actual riot that may have fatal consequence, and in our Town our best Friends threatened with Destruxion, alarming Hand Bills flying about, and a letter to Mr. Eliot threatening him with sudden death if he does not deliver up some arms seized at the Custom House for want of a cachet. Mr. Livingston stopt in the street, taxed with formenting rebellion, and his life threatened. When men of such benevolent Dispositions are attacked, what may we not expect? Next week the Assembly sits, when we expect there will be considerable Disputes, tho' for the sake of Union in the Colonies the Congress measures will be adopted; yet four fifths of this town are far from approving them in Gross.

We abound in pamphlets on both sides; I have done reading any of them.

A month later, public duty dragged the Honourable John away from home in connection with the security of the

colony's treasury-chest, a matter of increasing concern to those responsible in such exceedingly difficult and complicated hours. The treasurer's own report gives the immediate emergency, and the steps taken to meet it:

Perth Amboy, February 9th, 1775.

The House of the Assembly taking under their inquiry the state of the Eastern treasury and the security given by the treasurer, and signifying to Mr. John Smyth, treasurer of the Eastern division, that . . . the house required further security, on which Mr. Smyth named John Stevens, Esqr., and being then told that if he would procure said Stevens as one of his securities it would remove all scruples and give the house satisfaction and stop all further inquiries concerning the state of the treasury. Whereupon said Smyth applied to said Stevens and desir'd he would become one of his securities as above, to which said Stevens answered that he would comply with said request on the following condition and agreement viz

That all the publick moneys that by law ought to have been cancelled (but not done) should be cancell'd as soon as possible, and that said Smyth should not lend any money out of treasury without the consent of said Stevens; and these conditions being agreed to by the said Smyth, the said Stevens thereupon executed a bond with said Smyth, Messrs. John and Stephen Johnston, and Jonathan Deare, dated this day in the penalty of £10,000, proc. money, condition'd that the said Smyth justly and truly executes the office of treasurer.

Witness my hand John Smyth

It was to be more than fifteen years before the Honourable John would be able to conclude his connection, in one way or another, with this matter of the treasury.

Meantime, other accounts of the latest developments continued to reach Lebanon, usually in letters to the Honourable John himself but sometimes in those that his daughter Mary found means to send to her mother:

Clermont, Sept. 9th, 1775.

Its an age my dear mama since I have heard from you; if you have no opportunity of sending your letters, I wish you would send them to Philadelphia to Mr. Livingston and he will send them to me. I was in hopes I should have seen you this fall. I hope John will come with Mr. Livingston.

I begin to fear this war will last a grate while, as I dont hear the people of England are for us. G. S. [General Schuyler?] has been sick and left the Army but is much better and is going back. G. Montgomery has surrounded St. Johns and cut off all communication, the French are all for us and the Indians will not fight against us.

I am affraide the Congress will sit all winter; if that should be the case, I will come and stay with you grate part of the time. Everybody here has been sick except myself; they are all gone to grandpapa except Caty and myself. She desires her love to you; my love to all friends and my duty to papa. I wish he would get me the metheglin he promised me, as wine will be very Dear.

A month or so later her husband Robert wrote, regretting his inability to leave Philadelphia because the absence of so many others from New York's delegation made it imperative that he should remain. "I sent," he added, "by Mr. Cullen, a letter to Gen'l Gates which I hope John rec'd before he set out for Boston; if not [gone] I shall expect his company to the Manor"—whither he himself planned to start during the following week.

Johnny, according to his father's journal, had already left. The entry, dated two days earlier than Livingston's letter, runs: "Gave my son, on his leaving for Boston, £50 Proct.," but does not say whether Johnny was carrying the letter to Gates.

By this time the Honourable John had abandoned all idea of retirement, for there was hardly a day when the royal council was not in session. As late as September 25,

1775, the council's address to Governor Franklin, signed by the Honourable John as present, still avowed the council's "utmost abhorrence of any design to break up the British Government in America." But most of the members, with the echoes of the volleys at Lexington and Concord still ringing in their ears, felt that the discussion of peace with so thoroughgoing a Tory as Franklin could be little more than academic. All Jersey might swallow Franklin's unexplained parentage, or even attend his elaborate garden-parties; she could not suffer his obstinate clinging to King George. The "unruly three" councilors kept up the form of loyalty, but they were already trying to ride two horses over political fences that daily became stiffer. The presence of more and more British troops in Staten Island aroused fresh alarm in the Provincial Congress, and when Smyth the treasurer met with an accident in which he broke his leg, fresh claims were made upon the Honourable John. Smyth's letter to Samuel Tucker, president of the Congress, is taken from "New Jersey Revolutionary Correspondence":

February 26, 1776.

Sir:

Mr. Stevens, according to my request, has been so good as to come down to this place, to whom I communicated the letter sent me by the Congress relative to the removal of the Treasury, as I did to my other securities some time before. I find that they are willing to continue security for me, considering the difficulty of the times, provided the chest is removed to a place where the office may be executed in the usual manner. I would therefore propose that as I am not now able, and have little prospect of being so in less than six weeks, to attend the chest it be removed to Mr. Stevens', who will receive the taxes that are still to be paid in, and the county collectors may be desired to attend at his house for that purpose; in which case no one will or can have access to the chest

but those who have already entered into engagements, and are by law accountable to the public for the due performance of my office, which cannot in justice or reason be expected of me or them, without the chest is suffered to remain in my or their possession.

As this proposal fully comprehends the declared intention of the Congress in removing the chest, I cannot doubt its proving fully agreeable and satisfactory to them. Whenever I am able to attend to the duty of the office abroad the chest may then be removed to any other place that shall be agreed upon by all concerned—there to remain until we see happier times.

Mr. Stevens goes home by way of Brunswick, to whom I beg you will please to give your answer, who will forward it to me.

I am your most humble servant

John Smyth.

The next day the minutes ran:

On the question being put, whether the Treasury chest of the Eastern Division of the Colony, lately removed by a resolve of this Congress, from Perth Amboy, in order to be lodged in the hands of Peter Schenck, Esqr., at Milstone, for the sake of greater safety, be, agreeable to the request of Mr. Smyth, the Eastern Treasurer, carried to the dwelling house of the Honourable John Stevens, one of Mr. Smyth's securities, there to remain during Mr. Smyth's indisposition, or until this Congress shall take further order therein, on the terms expressed in the above letter, to wit, that Mr. Smyth and his securities continue bound by their former obligations; and provided they be at the charge of such removal? It was carried in the affirmative.

In obedience to this resolution, the Honourable John gave his personal receipt for "the sum of £6,101 2s, together with a bag sealed and said to contain £4,915 5s 9d." Thereafter he administered the office of treasurer until on July 15 he was allowed to stand security for his son's assuming it.

Before that date the Honourable John had stated his position to the governor:

Sir:

It is with the greatest concern I see the dispute between Great Britain and these Colonies arisen to the present alarming situation of Both Countries. While I had hopes of an accommodation of our unhappy Controversy, I was unwilling to quit a Station which enabled me to be Serviceable to my Country, but the Continuation of Hostilities by the British Ministry and the large Armament of Foreign Troops daily expected to invest our Country leaves me no longer room to doubt that an entire submission of These Colonies with a view to Internal Taxation is their ultimate object.

Your Excellency will not wonder that I should prefer the duty I owe my Native Country to any other Consideration. I therefore beg leave to resign my seat at the Council Board. I am

Your Excellency's most obedient and humble Servt.

John Stevens.

No sooner had his resignation been accepted than he was elected to represent Hunterdon county in the newly formed provincial council. New Jersey chose this body under her state constitution, adopted when she subscribed to the Declaration of Independence. A week after he took his seat, the Honourable John was voted into the chair as vice-president, which meant that he was to preside, throughout most of the Revolution, over the joint meetings of council with the lower house or assembly. Immediately, too, he was called upon to provide a share of the State's armament.

Brunsw'k 7th August, 1776

Sir:

I am directed by Convention to write you respecting a Piece of Cannon, either a four or six pounder, which they are informed is your Property, and is now in the Possession of

Mr. Vandyck of Somerset. They are desirous of purchasing Cannon of every size, as they have immediate use for them, and therefore would be glad to be informed whether the Piece just mentioned is your Property and for Sale. If it be, Convention, no doubt, will purchase it provided that, on Trial, it should be deemed fit for Service.

I am, Sir, with Respect,
your most obedt hum'l Serv't

Wm. Patterson

Like father, like son. Johnny Stevens, now a man of twenty-six, was prompt to offer his own services to the American army. His father wanted him to have a commission and to that end sent him at once to Stirling, who was already a prominent military figure in the State. Soon after setting out to secure a captaincy, Johnny wrote home:

I got to Basking ridge in the Evening. My Lord (Stirling) has given me a letter to General Washington. They proposed paying you a visit very soon. The next day I set out by way of Elizabeth Town. I saw a review of the Regiment & dined with Mr. Chetwood. Mr. Livingston has been there these three weeks, & has not been very well tho' better now. He was kind enough to give me a letter to Gen. Lee. Mr. L. told me there was a small bundel left at Mr. Morgan's in Bound Brook for Betsey. I lodge at Mrs. McAvoy's where are the Mr., Mrs., and Miss Delany; that past thro' our Country on their way from Bethleham. They live at Annapolis in Maryland. There is, too, a Mr. Loyd Delany with his wife, who is an exceeding pretty woman, very young. The two last, with Major Etherington & four more Sothern Gentlemen, who all lodge here, go in the packet for England that sails in a day or two. I called at the Post Office but no letters for Mrs. Reid. We have no news here to be depended upon except that Gen'l Schuyler has wrote to Congress that G. Montgomery has St. Johns besieged & that the Canadians join them very fast.

At that moment the news was not only as little to be depended upon as the absolute loyalty of one's next-door

neighbor, but also unbelievably slow in traveling. Too late to do anything to prevent it, the Honourable John was horrified to learn that his old and valued friends James Parker and Walter Rutherfurd had fallen under the suspicion of the council of safety, to be finally confined in Morristown. That theirs was merely a test case, designed to have its effect upon what the British military authorities might decide to do with certain other gentlemen detained in New York, now seems fairly clear. At the time it created a great stir in Jersey. Parker and Rutherfurd made frantic appeals to the Honourable John; his influence obtained for them a less stringent restriction and, ultimately, a release. Rutherfurd's British father, and the extent of his British business connections, made it hard to convince the colony's committee of safety that he was not an entirely proper object of grave suspicion. How much was to be expected from this committee in the way of soft-heartedness is brought out by a letter of Johnny's to his father:

Friday evening, 3 o'clock.

Mrs. Rutherfurd has just now met with a most terrible accident. By a fall from her chair, she has either dislocated her shoulder or broke her Arm—and now lies in the greatest agony. She has sent Conrad with this to entreat you to do everything in your power to prevail on the Governor and Council of Safety to permit Mr. R. to come home, if only for a day or two. We have sent for all the doctors in the neighborhood; the pain is exquisite and she apprehends she may not recover. For God's sake do all you can. I sent Charles with the hay this morning.

Being appointed one of the loan commissioners "in and for" Hunterdon county, Johnny had the duty of collecting every possible penny for the Continental armies. Thus, at twenty-seven, he was fairly well prepared for the new

responsibility, as state treasurer, which he assumed on July 15, 1776. His vouchers and reports were often written upon the blank half sheets of old letters or upon the torn ends of canceled indentures. They were drawn up in the field, by candle-light at a tavern table, or in the saddle under the moonlight. The treasurer's office was moved from place to place in the State and established wherever Captain Stevens found a place to hang his three-cornered hat without exposing state papers and funds to the enemy's rifle-shots. Sometimes at Burlington, it was again at Trenton, at Amwell, or even in Philadelphia, as the army moved up or down through Jersey. Its mere routine, with so many different moneys passing current, and with exchange values changing at almost every British or American hit upon the target, would have harrowed the soul of any man. Without a staff of bookkeepers and auditors; without steel vaults to hold the money; and often without definite legislative authority for some emergency step, it is hardly surprising that it should have been years after peace had been signed before a final settlement of New Jersey's Revolutionary accounts could be made.

It was not expected that his duties as treasurer would occupy the entire time of Captain—or Major Stevens, as he shortly became. The speaker of New Jersey's assembly relied upon the major to provide a proper ceremony for receiving a visit from William Livingston, by this time the State's governor after a close contest with Richard Stockton.

Tewkesbury 14th July, 1777.

Major John Stevens.
Sir

The Council of Safety sits in Germantown to-morrow—about, or a little before, Noon, the Governor is expected. Mr. Patterson proposes that some Officer of Note of the Militia,

some of the Gentlemen of the place, with a Small Detachment of Militia, would go out to meet his Exc'y on the way. That Matter must be under your direction as Col. Taylor I understand is out of the way. Perhaps, if you come up to Germantown in the morning, Capt. Berry or Rinehart or both might be able to collect a few of their companies to go with you. I believe it is generally expected that Mr. Rutherford and Mr. Parker will at this time show some evidence of their Attachment to the present Government. I wish they would ride up & take the oaths in a voluntary way without being call'd upon, perhaps a hint from your Father upon that Head might be of Service. If you think best upon consulting Mr. Stevens, I will endeavour to present their being call'd upon for the first day or two of Council's sitting to give them an Op'y of being Volunteers in the matter.

I am, sir, your very humble ser't

John Mehelm

This letter gave the Honourable John that opportunity, which has already been mentioned, of restoring Parker and Rutherfurd to good standing in the colonies. He was able to seize it because he was rapidly taking the position of secretary of state to Governor Livingston, by whom he was constantly called upon for advice and help. Correspondence, both personal and official, flourished between these two throughout the war.

Having occasion [wrote Livingston from Morristown on March 30, 1777] to desire the meeting of a privy council to take their advice respecting the erecting of Beacons or signals, agreeable to the request of his Excellency General Washington for the more expeditiously collecting our Militia on the next irruption of the enemy into this state, of which I expect he is under some apprehension; respecting the stationing of a guard near Woodbridge, pursuant to the petition of that part of Middlesex County; and on the subject of a proclamation of Congress for a fast, I shall be glad of your attendance

as one of the Board at Princeton on Thursday the 7th day of April about Noon.

I am your most h'ble serv't

Wil. Livingston.

The ever-helpful journal is filled with notes upon the reports and rumors of war which reached the Honourable John from all sources. Often, however, what he learned came to him in the most direct official manner. Thus, a day or two after he had made the entry "Oct. 4, 1777. T'is said General Washington made an attack on Gen'l Howe's Army at Chestnut hill near Philadelphia, at daylight," he had complete confirmation from Stirling:

Pawlin's Mill, 30 miles from
Philadelphia Octob. 5, 1777

Dear Sir

I have received your letter of the 29th Sept'r and am much afflicted to hear of the dangerous state of Mrs. Reid's health but hope soon to hear of her recovery.

The Event of yesterday, I do suppose, will be variously related, and therefore take this opportunity, which is an express to Baskingridge and which I send on purpose thro' Prince Town, to give you the particulars.

General Washington having obtained Certain Intelligence that part of Gen'l Howe's army was detached towards Chester & that the British & Hessian Grenadiers were encamped on the common near Philadelphia, thought it a favorable opportunity to attack the main body of his Army near German., and determined to endeavour to effect it by Surprise. Our Army accordingly marched from their encampment (then about 20 miles from Philadelphia) about 7 o'clock in the evening of the 3rd Instant and proceeded towards German Town, disposed with the following order. The Right Wing consisting of Smallwood's, deBoore's, Dayne's & De Haas's Brigades in one column to go in upon the right of the town, commanded by General Sullivan; these were flanked on the Right by General

Conway's Brigade. The Right [left?] Wing consisting of Muhlenberg's, Weeden's, Woodford's & Scott's Brigade, commanded by General Green, in another column, flanked by McDougal's, were to go in on the left of the town. The Jersey and Maryland Militia on the left of the whole, the Pennsylvania Militia on the Right of the whole, stretched near to Schuylkill, the Reserve of the whole, consisting of Maxwell's Brigade of New Jersey troops and Nash's Brigade of North Carolina, I had the honour to command.

The different corps got to their several stations near Chestnut hill about daylight, and immediately after attacked the Enemy's Pickets, which they drove in to Mount Airy, where the light Infantry were encamped, these also they drove before them down thro' the town and fields to the Market House. Two other Encampments were also soon Brooke up and in short the Enemy everywhere flying with the utmost precipitation and there was for three hours every appearance of a compleat victory.

But the fog of the morning, together with the Smoke of the firing, involved them & us in a cloud of darkness which prevented our seeing which way to follow, and from distinguishing friend from foe. This gave time for all the grenadiers to arrive from Philadelphia and their main Army to rally and form. The impossibility of our different columns acting together on account of the fog and smoke rendered a retreat absolutely necessary, which was effected with as much order as could be expected, their Grenadiers and fresh troops attempting to attack our Rear. But the Reserve which covered, advancing upon them, drove them back so effectually that they never again attempted to follow the Right wing of the Army; the left which took the White Marsh Road, were followed and overtaken about four miles from Germantown, but on their facing and giving them a few Cannon, the Enemy withdrew and never attempted anything further.

We came to this camp yesterday in order to refresh the Army and put it in condition to operate more successfully hereafter. The Loss on either side I know not; ours is not yet ascertained, but it must be but trifling, excepting some considerable officers wounded badly; among the rest Gen'l Nash

wounded by the Cannon Ball which killed Major Wedderspoon who was that moment with great composure receiving orders from me at the head of the Reserve then marching thro' the streets of German Town. I had a number of officers wounded from Mr. Chew's house which was filled with the enemy and which we were at last obliged to Cannonade.

Altho' we have not, in this enterprise, succeeded to our wishes, yet it will evince to the world that we can outgeneral our Enemy, that we can Surprise them, that we dare attack them, that we can drive them before us, and that we know how (when it is necessary) to Retreat in good order and defy them to follow us.

Our Army is in fine spirits and wish for another opportunity of engaging them in clear weather & a good Northwest breeze to clear away the smoke. We are now stronger than we were the day before yesterday and strong Reinforcements are high at hand. The Enemy will find that after every Battle our Army will increase and theirs diminish, and that this is fighting at such a disadvantage that they cannot support the war in America.

Covering the Retreat I had my horse killed under me without any mischief to myself but, as some who saw me fall reported me dead, I mention this circumstance to account for the report should it ever reach you.

You will be pleased to communicate this account to Governor Livingston, as I believe Gen'l Washington has not yet had time to write him. My best wishes to our friends and am

Your most obed't humble serv't

Stirling

Many other letters of the next spring illustrate the army's attitude, as far as Stirling could reflect it, upon events both military and political.

Camp Valley Forge April 30, 1778

In addition to the very unexpected accounts we have lately had from England, of L. North's propositions, &c, Mr. Robert Morris has received a letter from the patriotic Governor

Johnston Member of Parliament in which he tells him, that France is about to offer very advantageous Terms to America, and advises us not to be in a hurry to Conclude anything, for that Great B. will soon offer us terms still higher. In short, I am almost led to believe that if we appear strong-handed when the Commissioners arrive, they will give us Independence Itself rather than not accommodate matters; for they are hard run by the French, whom they cannot avoid going to war with, and are afraid we shall be in Alliance with Defensive & Offensive. I sincerely wish all our Battalions were filled,—that & that only will Secure us Success in the Negotiations.

Lady Stirling & all the Girls join in their love to all your family with your affectionate Humble Serv't

Stirling.

Camp Valley Forge, May 1st, 1778

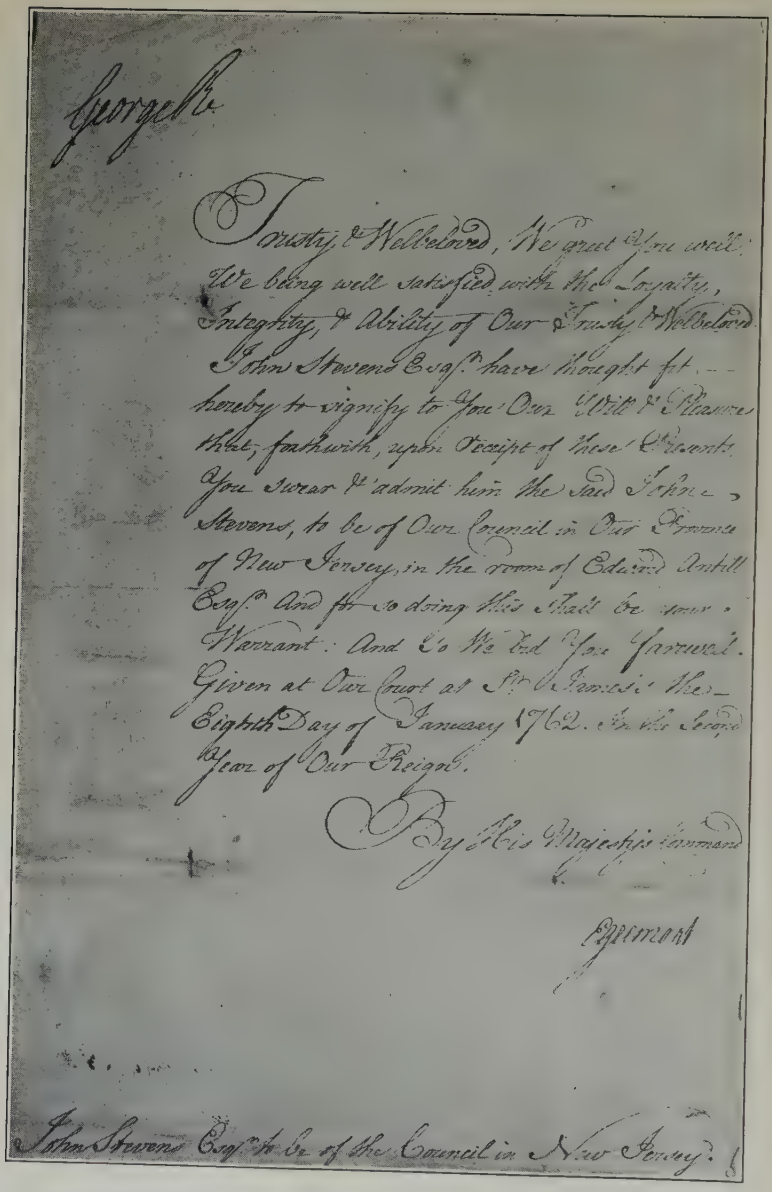
I wrote you two days ago by Lawrie Jun'r. Every hour almost since brings us extraordinary news from Europe. France and Spain have declared our Independence and have entered into a very honorable Treaty of Alliance with our Ambassadors, a French fleet is on its way to America in defiance of Great Britain; that is one side of the question. It is on the other certain that Commissioners are coming out from Britain with full powers to treat with us, even unto independency. This sudden change in their behaviour is owing to their having discovered that France was going into Treaty with us, and the fear of loosing us induces them now to give whatever we shall ask, to be in alliance with them.

Thus unexpectedly are two of the mightiest nations of Europe become Courtiers to the people of America and our efforts to bring this to pass will no longer be called a Rebellion but a Glorious Revolution.

Communicate the Contents to

Gov' Livingston. Stirling

Young Major John's view of the situation went on to Livingston at Philadelphia:



George R.

Trusty & Welbeloved, We greet You well. We being well satisfied with the Loyalty, Integrity & Abilities of Our Trusty & Welbeloved John Stevens Esq.r have thought fit hereby to signify to You Our Will & Pleasure that, forthwith, upon Receipt of these Presents You Swear & admit him the said John Stevens, to be of Our Council in Our Province of New Jersey, in the room of Edward Antill Esq.r And for so doing this Shall be your Warrant. And So We bid You Farewel. Given at Our Court at St. James's the Eighth Day of January 1762. In the Second Year of Our Reign.

By His Majesty's Command

Egremont

John Stevens Esq.r to be of the Council in New Jersey.

APPOINTMENT OF THE HONORABLE JOHN STEVENS TO THE NEW JERSEY COUNCIL

Dear Robert:

I have rec'd yours by Mr. P. Livingston, who brought with him a N. York Paper printed by Rivington, and I will venture to say the best his Press has yet produced. You will readily guess what it contained. Yes—his Lordship has here given up taxation—and for solid Reasons, too—For, says he, the Revenue to be drawn from America by it will never indemnify G. Britain for the Expence of the war. Besides the primary object was not to enforce taxation, but to support the supremacy of Parliament over the Colonies.

It is from the establishment of this power over us then, that his Lordship looks for an indemnification. Otherwise we may apply, with equal force, against Supremacy, the reasons he assigns for giving up taxation. But tho' this Supremacy may appear to his Lordship an object of vast importance, yet thus far I think we venture to decide upon it that, from the local situation of this country with respect to Great Britain, there are but two attributes of this almighty Power (if I may be allowed the expression) by the exercise of which she can draw advantage from us—Taxation and Regulation of Trade. The one his Lordship is willing to concede to us, the other was never disputed. 'For what then, were we precipitated into this expensive and disgraceful war?' is a question must naturally occur to every Englishman & to which it stands his Lordship in hand to give a satisfactory answer.

But, leaving him to extricate himself in the best manner he can, let us, my Dear Robert, turn to a more agreeable subject. And now I most heartily congratulate you on the happy effects of our Exertions to the Northard in the last Champagne. The Capture of Burgoyne and his Army has wrought Miracle in our favour and, if I don't mistake his meaning, it has gone near to reconcile L. North himself to Independence. All Europe seems ready (as it undoubtedly is in their interest) to espouse our cause. And indeed were they still to hesitate, fearful to draw upon them the resentment of Britain, yet the humiliating Concession she now offers to make, would infallibly determine them to take an active part. I cannot help flattering myself that the Period is not far distant that will

rid us of our savage enemies and restore this persecuted country to the Blessings of Liberty, Peace, & Plenty.

Do not fail to send the money you mention by the first safe hand, tho', if what we hear be true, I am in hopes you will not stand in need of it. Mr. M. Furman dined with us yesterday and among other things tells us that the Credit of Continental Money has lately rose amazingly in Phila. and that it passes current among them at the rate of two .Continental for one silver dollar.

J. S.

Similarly, the Honourable John had no sooner set down in his journal for June 20, 1778, "Gen'l Washington's whole Army crossed Corryell's Ferry and encamped at about Mr. John Hart's," than another note from Stirling arrived by express messenger.

Camp near Corriel's, June 22nd,
10 O'c. p.m.

I take the liberty of sending my two Baggage waggons to your care for a few days as they are to march light; we begin our march tomorrow morning at three o'c! Our Route I believe will be towards Prince Town. The waggoners, their horses, and the Servants you will be pleased to order to be quarter'd at some neighbouring house, who will be paid for it; when I want the Baggage I will write to you.

I wrote Lady Stirling this morning it will [not] be worth her while to attempt to meet me for the present. My love to all friends.

The army's objective was soon evident. A journal entry announced that "On Sunday morning, June 28th, near Monmouth Courthouse (the Weather very Hott) Gen'l Washington's Army attacked General Clinton." Some account of Lee's *débâcle* and the Commander-in-Chief's just fury might have followed, had not the Honourable John just then been peremptorily summoned to privy council by

the governor, who added, "I pray you will bring cash, if you have any, as the treasurer has not enough to honor the £500 draft of the Council of Safety of Princeton." The two Stevens' were called upon not only to keep the State's accounts but also to supply her, from time to time, out of their private purses.

Stirling, in these months, continued optimistically to anticipate peace. After writing to ask the Honourable John to represent him at the next meeting of the East Jersey Proprietors, he added, this time from White Plains:

Aug. 2nd 1778

We have nothing new in camp, excepting new deserters from the Enemy every day, and we are well assured that, if they could find opportunities, the bulk of their Army would follow them. The distress and confusion at New York must be very great; they are distracted between the design of escape by the way of Sandy Hook or through the Sound, and I believe the Commissioners would now gladly assent to our Independence provided they were suffered to depart in peace.

But Lady Stirling, perhaps because "it was not worth her while" to attempt to join her General, took a much more serious view in her note to Mrs. Stevens:

Middle Brook, Dec. 29, 1778

Dear Sister:

I hope Mr. Stevens and you will excuse my troubling you again, but as I know not who to applie to upon these occations but my friends, and as I think Mr. Stevens and you are among the greatest of that number, I applie to you with more freedom than to any other.

I should be happy if Mr. Stevens would let me know if Sister Hoffman and I are to have the Wheat he has ingaged for us, some time ago. We are uneasy about it as it was to have been at Baskinridge some time ago, and we shall be without bread if we do not get it, and I shall take it very kind of you,

if you know that Mr. R. Stevens has common tea and Muscovade sugar, if you will send the bearer of this to his house for 4 lb. of tea and my little bag full of Sugar with the prize of both and the prize of lofe sugar, Coffe, and Chocklet if he has any, for there is not anything to be had here.

Your Br. joyns me in love to you and yours and all that are with you and wish you all a happy Christmas and many happy Years. I am your affectionate Sister

Sarah Stirling.

I send a small bag for the Sugar and a pece of old linnen for the tea.

Lady Stirling's letter suggests the personal cares of the Honourable John; meantime, there was always his official family to be considered. Members of the state legislature and of Jersey's representation in the Continental Congress were constantly appealing to him. Of the former body, Nathaniel Scudder, for one, was anxious to resign his seat. He wrote the Honourable John because, he said, "I rely freely on *that candor* for which you are so distinguished and *that Friendship* which I flatter myself you entertain for me." Could not the Honourable John prevent his re-election? The service, said Scudder, had "added so much to the Reduction of the small Remains of my Private Fortune, to the Distresses and Uneasiness of my Family, and to the injury of my Children's education, that another year's attendance would be ruinous." He had "never been able to keep a servant and seldom a horse"; he was willing to submit his "Frugality and Economy to the strictest Scrutiny," but he did regret never having been able "in three instances to invite half a dozen of my most select Friends to a neat family Dinner at my Lodgings, notwithstanding innumerable Instances of Invitations from Members of Congress and other Gentlemen." Did the Honourable John think it possible for a man to go on in this way, even with the best

intentions? Might not others resign, to have their places filled by "ambitious, designing men of like contracted Fortunes, who might not so fully withstand those powerful lucrative *Temptations* which here surround us," as, said Scudder, "I firmly boast I have done"?

Abraham Clark, a signer of the Declaration for New Jersey, reported himself too ill to continue in the Continental Congress, a situation which he relied upon the Honourable John to understand and excuse. Dr. John Witherspoon, Princeton's famous president, wrote in December of 1780 to say that Patterson, Frelinghuysen, and Taylor were urging him to come to Somerset on "a Business of the utmost Moment which they say must interest my Feelings as a Citizen, a Whig, and a friend to the Liberties of Mankind." Would the Honourable John tell him what this business might be, and whether he ought to become involved in it or go on to Philadelphia as he had already planned? If Clark must retire, there would be all the greater need for Witherspoon's constant attendance in Congress, but he would be governed by the Honourable John's reply.

Elias Boudinot wrote that "nothing short of an invariable principle I fixed as the rule of my Conduct, at engaging in an Opposition to G. Britain, to be always ready on the Call of my Country," would induce him to accept a position in Congress for which he felt himself unfitted. Only because the appointment was "for a short time," though it proved to be a long term of years, including those as president of Congress, would he accept at all. And he begged the Honourable John that the legislature might furnish him with "their Ideas of the Number of Inhabitants of the State—with the true state of their finances—the state of the acct. between the United States and this state—and any other general matters that the delegates should be well acquainted with,"

because he was "confident Ignorance in these particulars have been and may hereafter be, peculiarly prejudicial to the publick interest in the present Important Era."

A month later, Boudinot, feeling himself rather slighted by the wording of his appointment to Congress, wrote the Honourable John again:

Philadelphia, July 24th, 1781

I set off from home on the 12 inst. I have just entered on my mission.

On Dr. Witherspoon showing me the Vote of the Joint Meeting, by which we were appointed, I was surprised to find that from the wording of it, Dr. Elmore & myself can have no vote in Congress without one of the former members are with us. I informed D. W. that I could not take my seat under this appointment and do justice to my own Character & feelings, but he assuring me that it was verily a Misprision of the Clerk, I have been prevailed on to continue until your answer on this Head can be had and if Possible a proper Certificate from Secretary by your Order.

In addition to settling these delicate points, the Honourable John had his own position to consider. At sixty-five he did not hold himself wholly outside the "draft," for his journal notes that "a man being Hired to join the Continental Army, for the class I am in, for 20 bush. wheat and 1000 Dol'rs, pd. Mr. Thos. Bowman £120 as my proportion & am to pay that of the wheat in the fall." A day or two later there is a note that he "this day paid Mrs. Furman 5000 Dol'rs as Mrs. Stevens' subscription to the Soldiers of the Jersey Line."

Meanwhile, Johnny's duties as treasurer were not always irksome. In February his brother-in-law Robert had written him from Clermont:

. . . I am sorry . . . you had not only *almost* but quite determined . . . to pay us a visit. But I see that the disapations of town have more attractions for you than our quiet retreat, and the gay fair ones of Philadelphia more prevailing charms than the untaught innocence of our Little belles. Tho' I suffer by this, it is too common to deserve censure and I acquit you. I expect shortly to hear that you are about to tread . . . in the way of all flesh—unless we except the stale flesh of old maids & Bachelors.

I have heard of the nomination you mention & am much obliged to the gent. who did me the honor . . . but I am persuaded the matter will go no further; offices of such importance are never obtained without solicitation & intrigue, & I am above both—indeed, too easy in my present situation to be anxious about a change. I rejoice that the Confederation is at last closed; it will give weight to Congress & enable them to agree to form a Council of State, which will be a better executive government than that of the whole body at large.

We are at present under the greatest embarrassment for the want of money; the new money cannot be drawn into circulation on account of the vast number of certificates which are now circulating. The legislature wish to emit it without regard to the old, establishing a fund for sinking the old at the current rate of exchange. We have it also in consideration to quit our claim, upon certain conditions, to the Vermonters, who are dividing themselves into two governments, taking a slice of New Hampshire.

Polly desires her love to you; she feels too lazy to write and pretends to have a headache. Betsey [his daughter] thanks you for the ribband and would send you a kiss—but Dick has nowhere how to carry it.

Meanwhile, Johnny, in his next letter home, gave his own impressions of Philadelphia:

I expect to leave this place Saturday. I find the town totally immersed in dissipation—the infection seems to have communicated itself to all ranks. There are sometimes three or

four parties a night. You can tell my amiable cousins that their friends have had their share.

I heard a story yesterday of a King's Speech which covered a disposition of the ministers for peace—but no one will say he has seen it. The Citizens last week gave an entertainment to the Officers of the Pennsylvania Line, at which an unhappy affair happened. One of the waiters of the Tavern refusing to deliver a sword to a Col. Craig, was by him stabbed in the breast, of which wound he died in a few minutes.

CHAPTER FOUR

No Revolutionary soldier could properly go a-courting unless he went on horseback. Least of all could a major, about to get his colonelcy, appear before his world with any lack of dignity. These points, as much as the general need of good horses for his journeys as treasurer, were in Major John's mind when he appealed to his father:

I have one favor to beg, which is that you get Ten Eik's horse for me. Tho' he is not as handsome as mine, yet I have seen no other near as good a match. If he does not incline to swap, get him for as low as you can for hard money, which you may engage to pay him in a week.

Rachel, daughter of Colonel John Cox of Bloomsbury, near the outskirts of Trenton, had captured the major. She was a descendant of the Langfeldts who originally settled New Brunswick. Her grandfather, as a Trenton lawyer, had been one of the commission to draw the line between East and West Jersey, as well as a member for some years of the royal council. Her father, as the operator of an iron foundry, assumed importance at the outbreak of the Revolution. In the fall of 1775 he had described his situation to that brilliant, tragic figure of Revolutionary Philadelphia, Esther de Berdt Reed, the wife of Colonel Joseph Reed, Washington's military secretary and later adjutant-general:

One of the Pilot Boats despatched some time ago to West Indies for powder, arrived a few days ago from the Mole, with upwards of 500 quarter casks & there are two more daily ex-

pected; so that, in all probability, we shall ere long be pretty well supplied in that articale, which we have been in great pains about—for, without that, all our spirit and military preparations would answer no valuable purpose.

If there should be any cannon shot wanted in the camp I should be glad you should think of Batsto [his foundry] as I could supply the Army with any quantity they might stand in need of. I am now casting for our artillery company. May God bless and protect you.

Eventually, Colonel Cox became assistant to Nathaniel Greene, the quartermaster-general. He served with Bayard's battalion of Cadwalader's brigade, missing the Christmas night attack on Trenton but crossing the Delaware in time for the battle of Princeton. Among the younger officers, however, these things were as nothing beside his being the father of five daughters known from end to end of Jersey and beyond it as the "Cox Beauties"—girls about whom the Continentals swarmed whenever Trenton was in American hands. In that quaint old print of Washington's "Triumphal Entry" into the Jersey capital on his way to be inaugurated President, beneath the banners that proclaimed him "Defender of Mothers" and "Protector of Daughters," the Cox sisters appear in the front rank of the "flower-laden maidens" who touched his heart and inspired him to notes of appreciation.

Although in that year of 1781 Colonel John had been expected to visit Clermont, too many gallant cavalrymen were hitching their horses to the Cox gate-post. He would not risk leaving Trenton, even when his father received a remonstrance from the chancellor.

Clermont, July 8th

. . . As for John, we give him no quarter & unless he is over head and ears in love, he will find it hard to make an apology for his silence and his absence.

It was more than a year before John could get quarter from his Rachel. Finally, while the guns were still roaring, on October 17, 1782, they were married. During her half century of life with a man she commonly addressed most formally as "Mr. Stevens," Rachel preserved a strong sense of humor. At critical moments, when her fortune as well as his own was to be mortgaged in some great new enterprise, she needed such a sense.

One anecdote handed down through the family is that of the colonel waking early one morning with his head full of plans for a new engine. Mrs. Stevens still slept beside him and, having no paper and pencil at hand, he sketched between her shoulders, with his finger, the angles of eccentric and connecting-rod. As she awoke, he asked: "Do you know what figure I am making?" "Yes, Mr. Stevens," was her answer, "the figure of a fool!"

She gave him children—nearly a dozen of them. She presided over his generous table; and when she had invited six guests to drink tea, only to find that he had casually brought in twenty others, she found some way to make the sandwiches and cakes go around. Her letters to her sons away from home were less often filled with anxious motherly advice than with accounts of their father's activities or of the events of the week, both at home and abroad. In everything about her, her interest was keen and her eye observant.

Some small help for the household when it was first established came from Stirling, who made Colonel John his deputy as surveyor-general for the eastern division of the State. "The law of 1719," ran Stirling's instructions, "requires the records of the office to be held in Perth Amboy. But, as the situation of that place renders it not only dangerous but impracticable, you are to open and hold a public office at Trenton (being, in my opinion, the most safe and convenient

place for the purpose) to record and safely keep all papers, etc. relating to the common Estate of the Proprietors of East Jersey." The matter of these records was of importance to the colonel's father, too, for the Honourable John was at this time president of the Society of Proprietors and very busy with an effort to obtain, through Sir Guy Carleton, British commander in New York, many society papers which had been carried to that city by Tory members evading the Jersey council of safety. Trenton being apparently a safe place for an office, the Honourable John sent there, to his son's custody, a large portion of the family plate. At the same time, not to be behind his son in public service, he accepted his election to the Continental Congress and sat through the next session—one mainly devoted to purely commercial questions.

During this year and the next the colonel was frequently called upon to practise law as the representative of the Proprietors in their many quarrels over property rights. These, as the closing months of the Revolution established the fact that peace was finally at hand, dealt with the many problems of readjustment between those who had been among the Continentals and those who had remained loyal to the crown. Property formerly owned in partnership by men who had taken opposite sides in the struggle immediately became matter for dispute between the parties, both being very frequently members or the heirs of members of the proprietary society.

Money standards were, of course, in a hopeless tangle, with much talk of repudiating both state and Continental currencies and of completely writing off the state debts to citizens through loan certificates and the like. To transfer the accounts of his office as treasurer became a huge difficulty for the colonel, not to be met without another drain

upon those resources of his father which had, of course, suffered like those of others through the seven years of war. An idea of the situation is conveyed by an extract from one of the colonel's letters to his father:

> As to the Continental money left with me by my uncle [Richard] I have it here except nine or ten thousand pounds I borrowed in order to make up fully the balance due the state. So that if you can purchase that much for me I shall be greatly obliged to you.

At this late date it is impossible to say upon what basis of currency the final settlement with the State was effected. One great hardship fell upon Colonel Stevens as former treasurer, through the repudiation by several of the States and by the Continental Government of the various issues of paper money, which thus became valueless except to numismatists. In fact, the trunks and boxes from which the bulk of the material for this story has been drawn also contain thousands of Revolutionary bank-notes of every denomination. Many of them were found to be as fresh and clean as though they came from yesterday's press; and yet by a stroke of the pen their face value was destroyed.

After the peace, the colonel and Rachel planned to go back to New York. Rachel's mother, writing to the Honourable John, says that "I do myself the pleasure to inform you of their safe arrival on Wednesday," January 14, 1784. "Their goods were one day too late at Brunswick," so the colonel "left my daughter," went to see after them, had them taken out of the Boat and sledded down to South Amboy, where they were again taken on board and went immediately to York." Colonel Cox was to have escorted his daughter to the city, but "he was again taken ill." Mr. Stevens, accordingly, "came himself in the stage—stay'd but one day with

us and then our sleigh took them as far as Newark, from thence they went on in the stage. Rachel received a letter from Mrs. Stevens which she would have answered but thought it might lay a great while here & that she could convey it more readily from New York." So much for the mails and for the transportation problems of those trying to get back across the Hudson after the British left.

The old family house at No. 7 Broadway was sadly in need of repairs, and the social side of life was seriously complicated. Close friends of other days still lived across the street or around the corner, but long years of war and passions had built up all sorts of barriers of misunderstanding and prejudice. Many a backbone, still loyally British, could not bring itself to bend to another that had as stiffly followed the cause of Mr. Washington; a bare nod in the street was often all that passed between those who had once been in the habit of dining together twice a week. Many looked upon the Stevens family as vile traitors to their king; a few, like the Van Cortlandts, welcomed them home. It is a good proof of the height reached by such social feelings that Rachel, after all the elder members of the family had been properly complimented in the matter of names, should christen her youngest daughter Catherine Sophia Van Cortlandt Stevens—a huge burden of gratitude to lay upon a small infant!

There were, of course, the Livingston and the Rutherfurd relatives, upon whom reliance for a certain amount of social activity could be placed. One invitation belonging to this period is a good example:

> Mrs. Rutherford's comp'ts to Mrs. Stevens, beg to know if the Treasurer and Mrs. Stevens are returned from Cromwall, and if we are to have the pleasure of their company at dinner this day.

Should be obliged to Mrs. Stevens for a tablespoonful of Creamer Tartar, will return it in a few days.
Monday morning
Please hurry boy.

No doubt Mrs. Stevens did hurry the boy with the vital tablespoonful, which was perhaps intended to make it possible to offer her a dessert at dinner. If she ate it that night, she probably arrived at the Rutherfurds' in her newest present from the colonel—a crane-necked chariot "with harness compleat," bought through Henry Waddington from Mrs. Wentworth for £142 8s—not to mention ten-pence for "advertising for the same."

For the colonel himself, there were old threads to be reknotted and new ones to be picked up here and there. In this year he joined the St. Andrew's Society, that time-honored association of Scots for the relief of their poor and deserving fellow-countrymen in America. The purpose of the society was one always close to the colonel's heart, and he had, of course, all the necessary qualifications of Scotch blood. His grandfather, James Alexander, was charter member and first vice-president of an earlier charitable effort, the New York Society of Scots, while in the later organization both his maternal uncles, Stirling and Walter Rutherfurd, were among the first to preside over the annual gatherings—"at six o'clock exact"—to honor the Land o' Cakes on St. Andrew's night. The colonel never missed those gatherings; he too keenly appreciated taking a glass of good wine—after peering through it at a flickering candle—with men whose anecdotes, and whose opinions on matters political and commercial, were as worthy of attention as those of their white-haired successors of to-day.

New York as a year-round home would have smothered

the colonel. To be buried alive in Lebanon, out of direct contact with all the city's activities, would have been as intolerable to him as to Mrs. Stevens. In the search for something between the two limits it was the lower end of the Hudson Palisades that caught his eye.

Hopoghan Hackingh—Land of the Smoking Pipe—was the Indian name for the rolling hillside upon what was originally a swampy island facing Manhattan from the west shore. An Indian origin for the modern Hoboken is a pleasanter one than any obscure village in Holland or Belgium, and Whitehead's exhaustive research into colonial history supports this Indian derivation. Land of the Smoking Pipe is certainly appropriate to the present appearance of the city, but in 1783, when the colonel crossed the river for a closer look at the land, there was no sign of any town. It was the view up the river and down the bay that made him explore the hillside and its history.

Its first place in written records had been given to it, in October, 1609, by Robert Juet of Henry Hudson's gallant *Halve Munde*. As mate of the good ship, Juet recognized his duty to set down in her log every event of interest; and, after describing a voyage of river exploration which ended on the second in a running fight with savages, he wrote: "Within a while after, we got down two leagues beyond that place [the top of Manhattan] and anchored in a Bay, cleere of all danger of them on the other side of the River," where he saw a good piece of ground; and hard by it there was "a Cliffe, that looked of the colour of white greene, as though it were either Copper or Silver Myne; and I think it to be one of them, by the trees that grow upon it. For they are all burned, and the other places are greene as grasse."

As to others after him, the serpentine rock had offered

RACHEL COX STEVENS

false promises of paying ore to Juet. Since his day three centuries of the river's nibbling have worn away some of the base, while boulders have been blasted off to build walls and arched gateways to the hillside estate. Men have drilled, scooped, and pounded down a level stretch for a row of long wharves. But above the smoking pipes of ocean-going steamers, the cliff still stares defiantly across at Manhattan, much as Juet described it and as the colonel saw it for himself.

Twenty years after that log had been written a deed, among the earliest of those in New Netherlands, had recorded the land behind the cliff as bought for a certain "quantity of merchandise" from the Dutch directors and council "for the behalfe of Mr. Michael Pauw, absent." To Pauw was granted full authority "peaceably to enjoy, occupy, cultivate, and hold" an estate which he never actually came from Holland to visit, although the Latin form of his name was made permanent by calling the whole tract Pavonia. His purchase was never popular with his Dutch associates, while those Indians who had been accustomed to deposit their peltries there for ferriage resented all paleface interference. As the records have it, the absentee ownership "occasioned much quarreling and jealousy, and prevented the colonies from prospering as they would have done." After a heated controversy, Pauw's fellow-directors of the West Indian Company had persuaded him to surrender his rights for twenty-six thousand florins.

In 1636, Hendrick, son of Cornelius van Vorst, had been the first white actual inhabitant. Four years later had come van Putten, under a twelve-year lease from Director-General Kieft. A house had been erected for van Putten by the Dutch company, in which he is supposed to have originated the business of brewing in Hoboken. But his tenancy had

soon been succeeded by that of Dierck Clausen, who had, in his turn, been driven out by marauding redskins, to leave No Man's Land behind him until Nicholas Varlet had it granted to him by old Peter Stuyvesant in 1663. As Colonel Stevens discovered, Varlet's marriage to the widow of Samuel Bayard had resulted in the property's descending into the hands of her children by her first husband and remaining a Bayard holding for over a hundred years.

In Revolutionary days the owner, usually called "Weeping Billy" Bayard, was known to the colonel and every one else as "a man of wealth and refinement." On his tract a garden had "flourished, filled with peaches, plums, and apricots; dwellings, stables, and outhouses for horses, cattle, and chickens had been erected, and a thousand young grafted fruit trees spread over the hillside and down into the plain." In 1771, Bayard himself had advertised it for rent as "at Hoebuck, lately established into a ferry, kept by Cornelius Hearing, with every convenience for the entertainment of travellers, such as one of the best of wharfs. A better fishing place for catching shad, etc.," continued the bill, "there is not on the North River, with plenty of oysters in the creek and before the door."

All true enough, in early Revolutionary days, when the Massachusetts delegates to the Continental Congress had been the guests of Bayard, then active in the cause of the colonies. But for all the influence the sturdy sons of New England had upon him, Bayard had decided that the crown would win and had seized the first opportunity to change his coat from blue to red. His bad guess meant that what war's raiding parties had left of his fruits, gardens, and dwellings had been confiscated from him as a proscribed loyalist and now lay waiting for the hammer of the State's auctioneer. Colonel Stevens, standing under one of the tall

forest trees near the edge of the cliff, took another long look up the river. What an estate for a man of thirty-five to own and develop! He resolved to go to the public sale and put in a bid.

Baron von Steuben, casting a covetous eye upon Hoboken, very nearly wrecked the colonel's plan. Writing to Governor Livingston, the baron hinted that a very graceful way of acknowledging such service as he might have given New Jersey and the Continentals would be through a grant of this particular tract. But Livingston fortunately took a different view. Freely admitting that the obligation was a great one, he pointed out that such a grant might establish a bad precedent in what was to be so democratic a country. Furthermore, would it not be a mistake for the baron, after losing so much gallant blood, to risk a hand-to-hand meeting with "that troublesome and venomous little volatile, the Musquitoe?" Annoyed, perhaps, by this frivolousness, von Steuben did not push his claim, nor back his interest to the point of bidding. On May 1, 1784, the tract was knocked down for £18,340 to Colonel Stevens.

Five hundred and sixty-four acres were covered by the first deed from Cornelius Haring, agent for forfeited estates, as the alien property custodian was then called, and a second deed transferred a further hundred and twenty-five acres. It was plenty of land, but Bayard's buildings were wrecks and his thousand grafted trees were stunted and withered; everywhere lay the ragged stumps left by soldiers cutting for their fires. As a beginning, the colonel proposed to clear out the dead wood, of which, in the autumn, he wrote to his father: "I have near 200 boats of wood cut at Hobuck, and hope to have 3 or 400 more by winter. I have made a road up into the yard which will save me much expense in cutting."

Early in the next spring Jacob Depuy and Gilbert Bodine, with D. Egbert, apprentice, obliged themselves "to sett out from Lebanon Township on Thursday next for Hobuck, and there undertake to build an House, Kitchen and Barn for John Stevens, Junr." The colonel, for his part, promised to "pay the three men Seventeen Shillings New York Currency at 8/10 the Dollar for each and every day the said Hands shall work at the Buildings aforesaid," in addition to agreeing to "provide a House for DePuy to live in, with Pasture for a Cow & Horse & Fire wood; to pay the Board for 3 men, and to employ as many more Carpenters as he shall think proper." Since such was house-building just after the Revolution, small wonder that it was far into the summer before the colonel could report to the Honourable John: "We expect the chimnies both of the house and Kitchen will be carried up by tomorrow night. I could not go to Rahway because my masons have just come and could not go to work without me." Lumber, standing ready to hand, was plentiful, but skilled workmen were so scarce that the colonel soon found himself "quite out of patience with the slow progress." For one thing, he was delayed by lack of the "nailes" which his father had promised to manufacture at Lebanon and send down to him. However, the colonel could at last say that he had "the floors laid in the back rooms above and in the back and front below," the "scratch coat" going on, and the roof in process of "paying with tar and Spanish Brown." Since there was "a vast deal of fence to build and Farming utensils and Stock to get," the colonel's loan certificates, bought from the Continental Congress during the war, went, with such "other paper" as he had, to raising a thousand pounds in cash. Of this sum, he had enough left to buy "a good little farm of 150 Acres, near Tappan," and he consequently begged

the Honourable John to spare him "the negro boy offered," as he found "there is no doing anything on a farm without a boy or two." When making this request he took occasion to add that "Rachel is much obliged to Mama for the Dyed Silk Gown."

That gown reached No. 7 Broadway in time for a significant event—the birth of the next Stevens generation. A son was the first of Rachel's eleven children; in deference to both grandfathers, she named him John Cox Stevens. To differentiate him from the three earlier Johns, he should be definitely thought of as "John Cox"—particularly because such bits of family history as have been printed often refer to "Colonel John *C.* Stevens" and thus confuse the father's achievements with the son's. John Cox never became a colonel; essentially, he was not an engineer but a sportsman. In sports he won and held a well-earned American prominence, but this was a long way ahead of him when the Honourable John wrote from Lebanon to express "no small concern at missing the celebration over the birth." To this grandfather it was cause for "congratulations with the family" that at last he had one grandson to offset Colonel Cox's eight granddaughters.

It was a blessing that was not to come singly. By 1787, the house at Hoboken was completed and overlooking what the colonel hoped to make a good American copy of the great English "parks." Keen as he was to occupy it permanently, circumstances were keeping Rachel on the New York side of the Hudson. No incident of her life was more important than that of which her husband, in October, wrote to Lebanon: "On Thursday week, last, Rachel was safely delivered of another fine boy—Robert Livingston Stevens." When the baby was two months old his mother added a postscript to one of the colonel's letters:

Mr. Stevens tells me that he has not said one word about the children. I take up the pen to inform you they are both well. I wish very much to introduce Robert to you. I can say, &, I think, without vanity, that he is one of the finest children in the State of New Jersey. He is much handsomer than John [Cox] but whether he will be as bright a child, time alone can determine.

R. S.

Time was not long in making that determination. So prompt was Robert in taking the lead that "Ask Rob" and "See what Bob thinks about it" became stock phrases with his ten brothers and sisters. The colonel, finding his own creative imagination reflected—brilliantly enlarged—in Robert's, proposed to give the boy a definite training in mathematics and the elements of mechanics, to put paper, pencils, and tools into his hands as his fingers were strong enough to hold them. Thus it was that Robert, as scientific knowledge widened and tools grew keener, became able to cut for himself a bold niche in the hall of American engineering fame. The colonel, as he went down the hill of life, was to see many a young and apparently foolish dream of his own come true through Robert.

One such dream came to the colonel when, soon after Robert's birth, the family, with its many trunks, carriages, and servants, attempted to move across the river. Never had it struck the colonel so forcibly that transportation was irregular, slow, and often actually dangerous. In fact, the ferriage seemed to be very little, if any, better than when it had been the subject of the earliest recorded ferry ordinance, in 1654:

Daily confusion occurring among the Ferrymen on Manhattan Island, so that the inhabitants are waiting whole days before they can obtain a passage, and then not without danger

and at an exorbitant price, it is Ordered, by the Director General and the Council . . .

The preamble had been followed by a long schedule of fares, under which ferrymen were allowed "for a waggon (either with horses or oxen), or a head of cattle, two florins," and must carry "savages, male or female," at the rate of about three to the florin. But the ferryboats had been of the crudest, to be succeeded by but slightly better pulling-boats and by sailboats properly termed periaguas, though usually known as "pittyaugers"—these last much of a piece with the one advertised by the "Gazette" of May 3, 1733, as "taken away from S. Bayard's plantation in Hoboken; thirty-one feet long, five feet wide, made of white wood and painted red, white, and blue; thirty shillings reward."

Since the Revolution, there had been little improvement; the same boats carried the traffic. Under oars they were slow; under sail they were the toys of wind and of the strong river tide. A crossing remained an ardent passage, not to be undertaken casually. But ferries were plainly profitable, for many private boats could be hired, and very often the municipal government of New York issued fresh ordinances to control them. Archibald Kennedy of lower Broadway once attempted to secure a monopoly of ferries; while, from the other side, Bogart of Hoboken was a keen competitor in the business.

To await any other man's pleasure instead of crossing the river at his own will was galling to the colonel. It was more for this reason than for a purely profit-making one that he decided to embark in the business with which his name has ever since been so closely connected. First of all, he had to buy out Bogart. His letters show that he "found a certain Vanderbeck chaffering with Bogart for his license, and

therefore agreed to pay the latter £1,250." He added that "if this sum is more than it is worth, still I am driven to it, or suffer my own ferry to be sacrificed." But the bargain was not entirely one-sided; with the license the colonel got title to one hundred-odd acres to add to the estate, and he could thereafter go and come across the river as he pleased. Until his death he would always please to work at better and more comfortable means of ferriage.

In the midst of buying the ferry, decorating Stevens Villa, and laying out elaborate driveways, gardens, and pastures, the colonel should have found few leisure moments. Yet, as soon as the new Federal Constitution had passed out of the hands of the Philadelphia convention he seized upon and earnestly studied it—a study certainly stimulated by the election of his father to the presidency of New Jersey's convention to consider a document materially different from what had been offered as the "New Jersey plan" of union. The draft brought down to Burlington by Witherspoon was much more like the Virginia plan, and therefore it could not be instantly acceptable to his fellow-citizens. But the Honourable John felt that the Constitution, as it stood, was so much better than it might have been that it ought to be ratified at once. In this opinion he was supported by Robert R. Livingston, who wrote him a characteristic letter:

Clermont, Dec. 8th, 1787.

I am very glad to hear the choice your county had made of members for the convention, & hope from the general complection of your state that you will have the honor of being the first in acceding to the new constitution. In saying this, I answer your question and let you know that it meets with my sincere concurrence, & indeed I sh'd censure a constitution which I had no small agency in framing, if I were not to approve it.

It is expressly formed upon the model of our state govern-

ment. My vanity is not a little flattered to find that the only *new idea* in government which has been started in America, where so many have thought on the subject, owes its birth to me, & has been adopted by such respectable bodies as Massachusetts, New York, and the general convention. I mean the council of revision, tho' the alteration they have made, in vesting this power of revision in the executive magistrate *alone*, rather than, as with us, in the Executive and Judicial, the latter of whom are independent, is a material defect, since the legislature have always been equally solicitous to encroach on both.

I have not leisure to enter into a minute description of the federal constitution. It is not without its defects, but these are abundantly over balanced by its advantages. A perfect government is hardly to be expected till angels make it, & perhaps not then—for we find the Jews dissatisfied & rebellious under a "theocracy" (or the government of God himself). In all popular republics the wise & the weak, the ignorant & the experienced, will divide the influence, & each must be gratified; their favorite child, like the son of the patriarch, will wear a coat of many colours—tho' this may excite the censure of envious brothers, yet I fondly hope that the parallel will still hold in this instance and our community, like the house of Israel, owe its prosperity to this reviled brother.

War [in Europe] is the great subject of conversation here; our diplomatic politicians say there will be none—I differ from them, the stake appears to me too large to be given up by either; it is no less than who shall direct the marine & politics of Holland & into which hands this East India establishment shall fall.

Since he claimed so large a share in its making, it has been astonishing to discover how the chancellor, as lawyer and as business man, ultimately interpreted it. Twenty years later he was inclined to blend the "coat of many colours" into a Livingston tartan. However, it is a fair presumption that he was always an opportunist; for the moment he was backing Hamilton in the fight for ratification by New York.

From what I can collect [the colonel wrote his father at Burlington], There is like to be a considerable opposition made to it in the State of New York. The Governor [Clinton], Lamb, and Willet are openly opposed to it; indeed, it is natural that men in office will set themselves against it. If, however, this Party should prevail, and the new Constitution be rejected, they will throw the state into the utmost confusion and must finally submit in case the other states adopt it. I have got my Cyder mill and Press [at Hoboken] finished and hope to make at least one hundred barrels.

In another letter after explaining that his long silence is due to having burned his hand in nitric acid (without adding what might well have been interesting details of his first experiments with chemicals and gases), the colonel went on:

I sent Col. Cox a pamphlet written by a Jersey Farmer; please to read it and let me know how you like it. The Constitution must be either wholly received or wholly rejected.

Cornelius has brought the cattle safely down. You have sent them to a bad market at this time, as Beef has sold in New York at 2d. the pound. We have thought it best to keep them. When the river closes up, Beef will be Dearer. I am much obliged to you for your offer of a yoke of oxen in the spring, as I am determined to secure the causeway in the completest manner possible and to open a road to Bergen. If Mama can spare as much homespun linnen as will make [black] Daphne a shirt or two, it will not come amiss, I believe.

It was the publication of John Adams's "Defense of the Constitution" which aroused the colonel to marshaling his own ideas and arguments. At Christmas he wrote to Lebanon:

I have sent Mama a political pamphlet, which was written by a very great friend of hers, the sentiments of which I hope will not displease her. Please to read it and give me your opinion.

The pamphlet was not a very thick one, but it bore the sonorous title of "Observations on Government, including some Animadversions on Mr. Adams' Defense of the Constitution of Government of the United States, and Mr. De Lolme's Constitution of England." On the flyleaf the author was described as "A Farmer of New Jersey," the printer being W. Ross, in Broad Street, New York. The moment it appeared on the street the work was universally accepted as coming from that brilliant pen made famous during the Revolution—Governor William Livingston's. To-day, where a library or an historical society boasts one, it is usually attributed to Livingston. But, since a copy found in Thomas Jefferson's papers bears Jefferson's own note, "Written by John Stevens," and since a part of the first draft is among the colonel's papers, the true authorship cannot be a matter of any doubt.

Upon many points the colonel disagreed sharply with Adams. "After reading the [Adams] book," said he, "we are constrained to call him, notwithstanding his great abilities, nothing more than a state empiric, who prescribes one single remedy for all disorders. Let the disorder proceed from what cause it may, you have only to administer a dose of 'Orders' and 'Balances' and the body politic will be immediately restored to health and vigour."

Enlarging upon his own view, the colonel declared that "the security of the liberties of a people or state depend wholly on a proper delegation of power. The several component parts of government should be so distributed that no one man, or body of men, should possess a larger share thereof than what is absolutely necessary to the administration of government." In the construction of a free government, "we should endeavour so to connect the interest of those in power with the interest of the community at large,

as to make the promotion of the public good, and their own private advantage, inseparable." Upon Adams and his "balance of power" theory the colonel was rather severe. How could "Adams' scale," held by the weakest hand and spilling now one way, now the other, produce an *average* of good government? "Is Mr. Adams," says the pamphlet, "a learned Doctor of Laws—or a posture master or rope-dancer? If, in order to understand the operation of political powers we must resort to mechanical powers, I would compare a well-constructed government to a jack"—meaning, not the screw-jack, but the then common spinning-jack for roasting meats.

"The weight," he said, "is the power from whence the motion of every part originates. However complicated in its construction—tho' one wheel may be made to impel another *ad infinitum*—yet, without the weight, the machine must forever remain at rest. Thus, too, if the weight should be opposed by an equal weight, the same effect will be produced; the machine must of course cease to move. But the friction of the wheels will be greater in one part than in another; and the meat, too, if not very nicely spitted, will give more resistance in one part of its revolution than in another. To counteract, therefore, the irregularities which these effects would produce in the movements of the machine, a *flyer* has been added, by the operation of which an equability of motion is at all times preserved. The flyer, indeed, is of admirable use. Let the tendency to disorder proceed from what cause it may—whether the weight should at times be too great or too little, the friction in some parts increased for want of oiling and cleaning or the meat put in the spit without sufficient attention to its true centre of gravity; whether the tendency to disorder arises from one or

from a complication of these causes, the efficacy of the flyer in preserving regularity and equability of motion is constantly and invariably the same. *It is scarcely necessary to add that, in government, the weight or origin of power is the people and the people only; the jack is the machinery of government, the motions of which are regulated by adding a check or flyer.*"

There are, in the pamphlet, other passages worth quoting. "Good government," wrote the colonel, "requires constant activity. The people ever have been, and ever will be, unfit to retain the exercise of power in their own hands; they must, of necessity, delegate it somewhere. Hence the immense importance of a *representative* Legislature and a Tryal by Jury." Again, when he was summing up his own case, he said: "After all it is by sober common sense and close application to business that the affairs of this world are to be managed; genius has too fine an edge for common use." For 1787 this was sound American doctrine.

Considering the Constitution as it had come from Philadelphia, the colonel proposed three amendments. To begin with, he suggested that the President should not be required to make appointments only "by and with the advice and consent of the Senate." As reasons for this suggestion, he adduced first, the dignity of the office; second, and more important, the unfairness of the Senate's insisting upon a voice in choosing the executive's advisers, and at the same time retaining the right to impeach him if he proved ill-advised. The colonel most clearly foresaw the political squabbles over patronage appointments which are to-day so familiar.

It was his second suggestion that the Chief Justice of the United States should hold his own office "during good be-

havior" and that he should have the appointment of his own associates, in the first half of which idea his fellow-citizens were not long in concurring. Thirdly, forecasting in some sense the very wide powers of present-day secretaries of the treasury, he advocated provision for a superintendent of finance. This officer was to manage all matters of collecting revenue and disbursing it; to appoint receivers, customs officers, and excise officers; and to form, with the President and the Chief Justice, a board to consider from three points of view—executive, judicial, economic—all bills that might be passed by the Congress.

It is impossible to say whether the opinions of the Jersey farmer, as expressed to his father while the pamphlet was being written, exerted any influence upon the convention over which the Honourable John presided. The latter had already had the valuable experience of steering his State's legislature through the hard years of the Revolution, and he was not likely to fail in any effort to crown the victory at arms. As to that, it appears that his convention, in spite of the failure of the New Jersey plan, was favorably disposed at the outset. Gouverneur Morris, writing to General Washington in October of this year, seems to have felt that this State would even go to the length of civil war to enforce Federal supremacy. "Jersey," he said, "is so near unanimity that we may count on something more than votes, should the state of affairs require *pointed* arguments." And it is, of course, a matter of record that to become the third State to ratify, New Jersey required only nine days of deliberation. This finished, her convention offered a rising vote of thanks to its president and directed him to present the official sanction to Congress, in person. In due course the Honourable John reported his compliance to Judge Brearley at Burlington.

Feby. 11, 1788.

Dear Sir:

As soon as I heard there was a sufficient Number of members met to make a Congress, I proceeded to New York, and on Friday the First instant I delivered to the President in Congress Assembled the New Jersey Ratification of the proposed Constitution of the United States; and I have the pleasure to inform you that in conversation with the President at the Chancellor's, he said he had no instructions to make me any answer to what I said to him in Delivering the Ratification, but that he thought it the most ample of any that had been delivered to Congress, and in particular, the Convention's reciting the powers by which they were convened. I was exactly in time, as the First of February was set down for taking up and entering the several Certificates, and I delivered ours before they began that business. Pray present my best respects to Mrs. Brearley.

Your obed't Serv't

John Stevens.

This was to be the last act of the Honourable John's public life, and a fitting climax to many years devoted, as he found opportunity, to the service of the State. During what remained to him of life he would maintain an active interest in everything that absorbed his son's attention and would also continue to be the leader in directing the still unsettled affairs of the East Jersey Proprietors. Up to the end, too, he made regular trips through the State in order to keep a personal eye upon his widely distributed property.

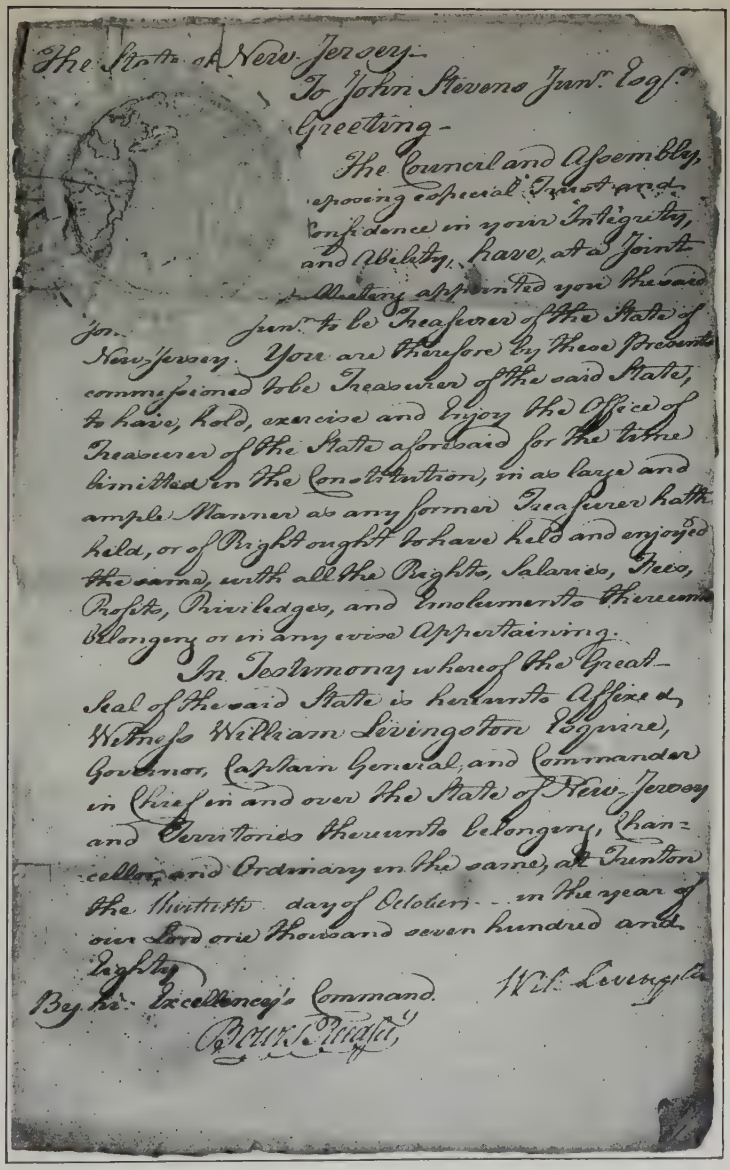
For the colonel the spring of 1788 opened a busy year and a memorable one. On the New York side he improved the family property by sinking a bulkhead in the river, filling in behind it, and building what was then a considerable dock for private purposes, being all of ninety-six feet long. Its actual constructor, one Elias Burger, agreed, upon receipt

of his total charges of £48, "to keep said dock in good repair for a year and a day." On the Jersey side, the crop in Hoboken proved to be such a bumper that the colonel wrote to his father: "I have so much produce to take in, and am so behind hand with my work, that I cannot think of leaving home at present." However, he did find further time to dwell upon national affairs.

Among other things that interested him in this connection were the writings of Dr. Richard Price. This English dissenting minister and speculative philosopher, the friend of Franklin, had always been an advocate of independence for America and of liberty in general. Indeed, it was he whom Burke, in the famous "Reflections," censured for his warm support of the French Revolution. Writing to thank Dr. Price for expressing belief in the bright future of the United States, the colonel joined his own prayers to those of the doctor for so happy an end. In conclusion, his letter ran:

> To form a national government, sufficiently energetic to coerce obedience, and at the same time to leave such a degree of independent sovereignty to the states individually as would prevent a complete consolidation, was no easy task. Local interests and prejudices, the pride of state sovereignty, an aversion to innovation; these, and such like considerations, had well nigh rendered abortive the labours of our genuine and best-informed patriots. Yet the features of the new Constitution are, I trust, so happily blended as to produce one WHOLE which, for strength and beauty, I may venture to call unrivalled.

However, though a subscriber to democratic principles of government, the colonel was very much the aristocrat at heart. For one thing, he liked good clothes and never grumbled at the size of his tailor's bill. He believed that



The State of New-Jersey.
To John Stevens Junr. Esqr.
Greeting.
The Council and Assembly, reposing especial Trust and Confidence in your Integrity, and Ability, have, at a Joint Meeting appointed you the said Jon. Junr. to be Treasurer of the State of New-Jersey. You are therefore by these Presents commissioned to be Treasurer of the said State, to have, hold, exercise and Enjoy the Office of Treasurer of the State aforesaid for the time limitted in the Constitution, in as large and ample Manner as any former Treasurer hath held, or of Right ought to have held and enjoyed the same, with all the Rights, Salaries, Fees, Profits, Priviledges, and Emoluments thereunto belonging or in any wise Appertaining.
In Testimony whereof the Great Seal of the said State is hereunto Affixed, Witness William Livingston Esquire, Governor, Captain General, and Commander in Chief in and over the State of New-Jersey and Territories thereunto belonging, Chancellor, and Ordinary in the same, at Trenton the thirtieth day of October in the year of our Lord one thousand seven hundred and Eighty.
By his Excellency's Command. Wm. Livingston
Bowes Reeder,

COLONEL JOHN STEVENS APPOINTED TREASURER

clothes certainly helped to make the man, and when misfortune overtook him on an early spring journey by coach, he could hardly wait to reach the printer's with his advertisement:

LOST: From the stage-waggon, on Wednesday, somewhere between Major Egbert's at Brunswick and Major Reading's at New Ark, a small HAIR TRUNK, with brass lock and handles, containing, amongst other things, a variety of articles of apparel. Six ruffled shirts, marked J. S.; a pair of black silk smalls, a pair of Buff casimer ditto, a white coat with silver buttons; Some Money, and other articles of value to none but the Owner. Whoever lodges such information as will permit the Owner to recover the contents shall be liberally rewarded.

It was no moment to lose such things. Entertainments inside Stevens Villa or upon its wide lawns were already a feature of each season; to be short of ruffled shirts and silver buttons could be nothing less than humiliating. Thus, although the record is entirely silent upon the fate of the trunk, it is to be hoped the colonel's peace of mind was restored by his recovering it, brass handles and all.

The Stevens children were doing famously. Robert, at six months, was gravely reported as having "half a dozen teeth," while young John was already eating "salt pork and apples all day long!" By August, Robert could "almost walk" on the very day made memorable by the decision of Congress to "make New York the place of meeting under the new Constitution." The day before, it appeared, they had "carried it by 6 or 7 for Baltimore, but Carolina changed her vote and Georgia was divided, so it went for New York 7 to 5." Under these circumstances the colonel was willing to consider the proposal that he should himself be a candidate for a seat in the august body.

It would be very convenient for me [he admitted] to be a representative, tho' I am not very sanguine, as I am not inclin'd to take the pains that some will, in order to get it. I have a few days ago written to the Speaker, I have sent him a number of my pamphlets to distribute among the members. Also, a draught of a constitution for this state, together with a pretty long letter which I desired he might communicate to the house. So you will see I have given them a sample of my abilities, by which to judge how well I may be qualified for this business. If, therefore, you think there is a chance, I have no sort of objection to my name being made use of.

Some of the colonel's "qualifications" and opinions may be gathered from a letter he sent to Samuel, brother of Richard Stockton, the Signer, and husband of Mrs. Stevens's younger sister:

I had no opportunity of conversing with you on political matters while at Princeton. I am informed the Assembly have taken a vote on . . . the Election Bill prescribing the mode of choosing representatives. I conceive this to be liable to several weighty objections.

As every man throughout the State, entitled to vote, will be entitled to hand to the clerk of this county such nominations as he may think proper; thus the nominations will be very very numerous. . . . Public attention will be so much divided and distracted by the multiplicity of candidates that the very purpose of previous nomination will be defeated. The public, respecting the men they are to vote for, will be very vague and uncertain; it will be impossible that a proper scrutiny may be made of each candidate. This may put it in the power of a combination, amounting to not more than one-tenth of the State, to send representatives to Congress. The majority in each county may vote for some favorite within the county, and the votes be so split that a man might be returned without one-twentieth part of the whole vote.

I would propose a mode similar to that in the draft of a State Constitution enclosed for your perusal. By this, no

candidate can be elected by less than a majority of the whole vote, and the number of candidates is so limited that every man may become acquainted with their character. The success of the new constitution will depend very much upon the wisdom and virtue of the men who set it in motion. According to the direction they may happen to give it, its future operations may become mischievous or salutary. We are especially called upon, in an election law, to lessen the chances of men not duly qualified being returned by us.

Another important consideration. Jersey sends but four members, whilst other States send eight or ten. We should endeavor to make up, by the weight of influence, our deficiency in numbers.

The draft of Constitution enclosed was put together at different times this fall, as an amusement of leisure hours.

Although his candidacy was warmly advocated, in letters written by both the Honourable John and Colonel John Cox to their influential Jersey friends, it presently transpired that Colonel Cox secretly longed to be a candidate himself. Not wishing to run against his father-in-law, Colonel Stevens promptly withdrew; a step which he inwardly regretted but which it is as well that he made. Had he become deeply involved in the frantic struggle for legislation appropriate to the new Constitution, and had he devoted himself to all the almost insuperable difficulties confronting both State and nation, not even his abundant energy could have met the new and engrossing interest which now seized upon him, never to let go.

CHAPTER FIVE

THE colonel's grandfather, deploring the primitive communication of his dark age, had been able to do little beyond petitioning the Jersey legislature for improvements. Under the same impulse the Honourable John had become an active commissioner to build better highways across the State. Fifty years after his grandfather's death the third John Stevens felt the family urge and recognized transportation as the chief national need. Young enough at thirty-eight to begin a new life's work, he prepared to produce means for meeting that need upon the water.

"It was," says his own apologia, "toward the close of the year 1788 that my attention was drawn toward the improvement of the steam engine. Mr Rumsey, Mr Fitch, and others had made several attempts to apply the power of a steam engine to propelling a boat. But there was an obstacle which lay in the way, to remove which appeared to be indispensably necessary in order to render the project of any utility. This was the great *weight* and *bulk* of the boiler, when constructed in the usual manner. To effect this, Mr Rumsey invented what he called his *pipe* boiler. As this invention was supposed to be a great improvement, and became a subject of general discussion, I was insensibly led to direct my thoughts upon this important object."

James Rumsey of Virginia and John Fitch of Connecticut had already begun their bitter fight over relative priority in steamboat invention, a fight from which neither emerged with the credit justly due him for contributions to the in-

fant science. In various pamphlets and treatises each set forth his claims, supporting these by affidavits from personal friends and by statements from all available well-known men—including, in Rumsey's case, General Washington himself. Chancing upon one of these pamphlets, the colonel hunted out the rest, studying them and setting them aside for further study. After considering the claims and making many notes, he wrote to Rumsey:

September 5th, 1788

I shall not trouble you with an apology for thus addressing you, although to you an utter stranger. If the following hints prove of any service towards perfecting your project you are heartily welcome to them. Though they may not suggest anything new yet, as the writer thereby manifests his good wishes toward the promotion of useful discoveries, you cannot but be pleased with them.

I have not been able to procure any other information respecting your plan of propelling a Boat by means of Steam than what I could collect from your pamphlet published at Philadelphia and from another published at the same place, entitled "Remarks on Mr John Fitch," etc. Your invention of generating steam by means of a worm is certainly of the utmost importance, but more particularly so when applied to the purpose of navigation. An insuperable objection to the application of steam in any mode hitherto made use of is the very great proportion of room which the boiler and other apparatus must necessarily occupy on board a vessel. . . .

Suppose *a b c d* to be a circular stove of sheet or cast iron. The figure *e*, within the same, will represent the convolutions of a worm made of copper or other metal; these convolutions must lie close, one on the other, to prevent air and smoke from passing between them.

From the top of the worm a funnel or flue must be carried to the height of a foot or 18 inches above the top of the stove. The fuel must be placed in the upper part of the stove on each side of the flue.

As soon as the flue becomes sufficiently heated, the current of the smoke and flame will follow the course represented by the dotted lines in the figure; that is, after passing down through the sides of the stove and the outer edges of the worm to the bottom, then rising up again in the circular space contained within the convolutions of the worm, the smoke will finally issue out at the top of the flue. The smoke thus descending through the live coals, resting on the grate at *f f*, is converted wholly to flame and acquires a degree of heat much more intense than when it passes immediately upwards in the usual way.

Within the worm aforesaid should be another worm, extending the whole length thereof; the interior worm should be filled with water (this to be supplied by a reservoir placed above the stove and over the flue) and should be perforated in different parts of the circumference with small punctures or holes, so as to distribute the water equally against the side, or inner circumference, of the outer worm. It is obvious that a machine thus constructed would occupy very little space, would be very light, and would generate an immense quantity of steam.

With very little additional machinery, the piston, which is raised by means of the steam and depressed again by the pressure of the atmosphere, might be made to force water, through two trunks alternately; through one at the rising, and one at the falling, of the piston; by which the force of the engine would be doubled.

In this letter the colonel expressed the opinion that the chief objection to Rumsey's device would lie in the impracticability of obtaining "any *great degree* of velocity" if applied to vessels. However, said he, a "simple contrivance" might give "motion to a system of oars and, by lengthening or shortening the paddles, a velocity of perhaps fifteen or twenty miles an hour might be acquired." Thus, at the outset, the colonel emphasized what was to be the object of every Stevens effort for the next hundred years—more speed

without undue waste of power. No one more clearly foresaw the future's demand for rapid transit and delivery; no one, in the face of every discouragement, worked harder to meet that demand.

Not wishing to be beaten by Fitch or Rumsey at the start of the race, and hoping to secure legal standing with other inventors, the colonel next wrote his friend and city neighbor, John Watts, then very active in New York's legislature.

I see by the proceedings of the Legislature, printed in Child's paper, that Mr Rumsey petitioned for an "exclusive privilege" of building Steam Boats, and that Mr Fitch has petitioned "that the prayer of the petition of the Rumseyan Society may not be granted." As neither of these gentlemen, from what has yet appeared, have brought their Schemes to that degree of perfection as to answer any valuable purpose in practice, I conceive that neither of them are entitled to such an exclusive privilege as may secure to them all the benefits arising from the improvements invented by others. When an application of this nature is made to parliament it is usual, I am informed, for the parties to exhibit an exact model or at least a draught of the machine or improvement for which they are desirous of obtaining an exclusive privilege. And, if they —or others—afterwards make any material improvement, another patent may be obtained for such improvement. This mode of proceeding is obviously necessary and proper. I am unacquainted with the particulars of either Mr Rumsey or Mr Fitch's plans, but—be they what they may—they should, at least, be exactly and minutely described before any exclusive privilege be granted. Under a presumption, therefore, that the legislature will in this business adopt the mode practiced in England, I have been induced to draw up the enclosed petition, which I request the favor of you to present and at the same time to support, as far as it may appear equitable and proper.

Had the experiments of either of the Gentlemen who have

petitioned succeeded so far as to prove that their machines, without still farther improvements, would answer any valuable practical purposes, I should not have troubled the legislature with my petitions. But it should appear that my machine is totally different in its structure and principles, from that of either of the Gentlemen. The only thing which my scheme has in common with the plan of either of these Gentlemen—so far, at least, as has come to my knowledge—is that, with Mr Rumsey, I raise water thro' the bottom of the boat and force it out at the stern. But, as this is an invention to which neither of us is entitled, we have both an equal right to the use of it. It was a Mr Donaldson of Philadelphia who first tryed the experiment, and it is said the hint was given him by Doc. Franklin.

If Fitch & Rumsey have not yet exhibited exact draughts or models of their different engines, which they should certainly be required to do before a patent can be granted to either, I must request of you not to show my draught and explanations—except to such gentlemen in whose honor you can confide, under a promise not to communicate it to others . . . Should the Chancellor be at Albany, please to show him this together with the enclosed.

With the description of his boiler the colonel sent an exhaustive comparison of it with Rumsey's apparatus, which he thought less efficient than his own "perpendicular tube" design. In substance, he claimed the following advantages:

A form of tube admitting the use of cast iron.

The lower end of the tubes never exposed to the immediate action of the flame, and no difficulty in keeping the joint tight.

Jets, dispersing the water over the surface of the tubes, insuring equal heating and preventing sudden production of steam and danger of bursting.

A great saving of space and consequent greater ease in handling the steam.

Greater heating surface and more rapid generation by

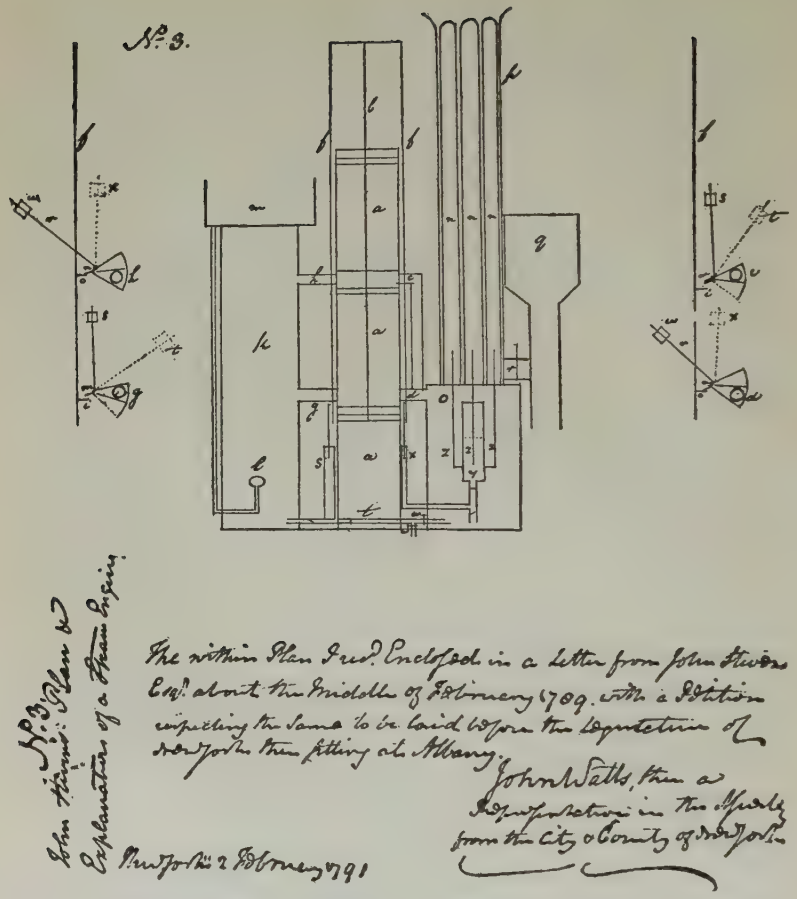
"spreading the water more thinly" over his tubes than was possible with Rumsey's pipe.

More perfect control of the steam, with the ability to raise it to "four atmospheres" (60 pounds).

Applying pressure to the piston in both ascent and descent, to obtain uniform resistance and smoother operation. Not depending, as Rumsey did, upon counteracting the expansion of steam, on raising the piston, by only the weight of the atmosphere and that of the water in the pump.

John Watts presented the colonel's papers to the legislature on February 9, 1789. They were referred to a committee including among its members G. Livingston, Mr. Van Cortlandt, and others, already engaged with Rumsey's petition. Since none of the committee knew anything about steam, they could not pass upon mechanical differences or relative merits. Under existing law they might have granted "exclusive privileges" to both petitioners, but they chose to play safe by sticking to the rule of first come, first served. Rumsey having been a few days ahead, the grant made to him on February 25 was a perfectly natural outcome of the general ignorance. Pending this action, the colonel proceeded with further sketches and plans; discussed engines with Nathan Read, the Salem experimenter who visited New York at about this time; and sought out any one else who had even a glimmering of knowledge in steam. Fascinated by the new study, he resented every interruption of it but could not avoid many of them.

He was, for example, obliged to be constantly in New York in an effort to sell No. 7 Broadway. Failing in this, he urged the Honourable John to let it to "a lady by the name of Laurens, from Boston," who proposed to run it as "a lodging-house for the Gentlemen in Congress from that State." Since "the rental would be £100 a year," said the colonel, "I am apprehensive that, if you do not accept of her


No. 3.
The within Plan I recd. Enclosed in a Letter from John Stevens Esqr. about the Middle of February 1709. with a Petition requesting the same to be laid before the Legislature of New York then sitting at Albany.
John Watts. then a Representative in the Assembly from the City & County of New York
New York 2 February 1791
John Stevens's Plan & Explanation of a Steam Engine

THE EARLIEST STEVENS ENGINE, A DRAWING EVENTUALLY USED TO PROMOTE THE FIRST UNITED STATES PATENT LAW

as a tenant, the house may stand empty." Certainly, he himself had then no wish to live there, for he was too intent upon keeping the children out of the city. Although Hoboken had no doctors, John Cox "happily escaped taking the small-pox" then epidemic in New York, while Robert, though "afflicted with a bad breaking-out on his face," could soon be reported as recovering rapidly. At the moment, Hoboken was a health resort by comparison.

The unfavorable news from Albany did not convince the colonel that his engine was not sufficiently different from Rumsey's to merit some special protection; he proposed to appeal directly to the Federal Congress. If the provision of the Constitution calling for "the encouragement of science and the useful arts" meant anything at all, it must authorize Congress to legislate along this highly desirable line. Thinking it high time something of the sort were done, the colonel submitted a petition similar to that sent to Watt, asking Congress for patents to cover his boiler and his "method of propelling a boat by steam." His arguments in favor of steamboats described his dreams of the "happy consequences" which might attend "rendering the intercourse between the most distant regions safe and expeditious." He considered it evident that from "a reciprocal exchange of the production and manufactures of one country for those of another a general advantage would result to the whole. The earth would then be everywhere stimulated to bring forth with its utmost vigor; civilization and the arts would spread rapidly over the face of the globe; then, and not till then, might it be said that man was really the master of this world, with everything in it subservient to his will." Fearing, however, that his picture might seem too highly colored for general appreciation, he added an "apology for this rhapsody."

Among the men then in Congress, he had a number of friends to whose particular attention he presented the awakening of American interest in science and invention. To prevent the sort of wrangling that had arisen between Rumsey and Fitch, he urged immediate and comprehensive legislation; without this, he said, confusion as other men came forward to clamor for protection would be worse confounded. Something must at once be done. As his friends began to press his points a spirited debate followed, with the ultimate result that Congress, in April, 1790, framed the first Patent Law of the United States. While this was still in the form of a bill, Rumsey in a letter to Thomas Jefferson reported it as being favorably regarded, but failed to add that it had been sponsored by the "stranger" who had ventured to trouble him with a few suggestions on boilers and engines. Through such omissions as this it has escaped the notice of the two groups chiefly concerned—engineers and patent lawyers—that the colonel, himself barely started as an inventor, had stepped into the position of godfather to all future members of that honorable if precarious profession.

As soon as the new law became effective the colonel and others applied for protection. Jefferson, having assumed the portfolio of State, appointed Henry Remsen, future cashier of the Manhattan Bank, his secretary, and it was from Remsen that the colonel received reports of progress.

Philadelphia, January 25, 1791

The Commissioners named in the act for the promotion of useful Arts, judging it most expedient not to proceed further in the business thereby committed to them, until a bill supplementary to the said Act, and which is now before Congress, passes, have directed me to inform you that the hearing of the

parties who have applied for Patents for the discovery of new applications of Steam to useful purposes cannot take place on the first Monday in February, which was the time they had assigned for the purpose, but that they will be duly informed of the day as soon as it is fixed.

John Stevens, Junr, Esq.

Two months later Remsen reported that "the claimants for Steam-patents are required to have their claims ready for hearing on the first Monday in April next." Jefferson, taking patents very seriously, was not to be hurried. When an application reached him, he sent for the secretary of war and the attorney-general—his fellow-members of the board—and gravely read them the complete specification. With his own opinion, he weighed theirs as to originality and priority, bluntly determined that there should be nothing haphazard nor any perfunctory issue of patents upon payment of the stipulated fee. Since he was the only member with any real pretension to mechanical knowledge, it is not astonishing that long delays brought disappointment to the applicants. In April, the colonel urged Remsen to expedite action because he himself was "actually engaged in constructing the different parts of the machinery of a Steam Engine, in order to make an experiment for propelling a Boat." He also wished to know whether Fitch and Rumsey had reached an "accommodation" of their rival claims, and of this he learned something from Remsen's letter explaining the delay.

May 4th, 1791

. . . The investigation of the claims of Rumsey & Fitch to a priority in the application of Steam to navigation, which was to have been made by persons mutually appointed by them, was attempted but not compleated; and the Commissioners at a late meeting agreed to grant patents to them—and to all claimants of steam patents—according to their respective

specifications. I have since then been almost constantly engaged in drafting patents by the specifications, to be submitted to them at their next meeting—which will be on the last Saturday of this month.

The annexed will show what progress I have made in describing your improvements, and, indeed, how far your specification enables me to do so. It is silent with regard to some of them which I must beg the favor of your describing. The Commissioners have required the descriptions, in every instance, to be inserted in the patents from the claimants themselves, but I felt disposed to be at this small trouble with respect, Sir, to you, as you was at a distance. They also require models and draughts of each invention, discovery, or improvement, before the delivery of the patents.

The description of your several improvements should be distinct from each other; but they may be made out on the same sheet of paper, which can be annexed to your Specifications. No references should be made in it to your draughts. If you finish them before the 15th inst., you can put them under cover to Mr Jefferson; if you do not, by that time, it will be best to enclose them, when finished, under cover to Genl Knox, as Mr Jefferson about the 15th leaves town.

The required description was as follows:

The cylinder lies horizontal in the bottom of the boat and, on each side of it, is placed a vessel somewhat more capacious than the cylinder itself nearly filled with water or oil; into each of which vessels the steam from the boiler is alternately admitted and propels the water or oil into each end of the cylinder. By this means the piston is driven backwards and forwards by the action of the water or oil upon it.

The piston, being hollow, is of the same specific gravity with the water or oil. The rod of the piston has a number of teeth which catch in the teeth of a small wheel, on the axis of which is fixed another, larger wheel, the teeth of which catch on each side into the teeth of two rods which pass thro' the stern of the boat. To the ends of these rods, floats are

fixed, which operate as paddles to propel the boat thro' the water.

Hoping to expedite action, the colonel next addressed the commissioners directly, forwarding a list of "the following improvements respecting the generation of steam and the application thereof to different purposes, not before known or used":

1. A Boiler, being a collection of tubes placed vertically and opening at each end into a vessel containing steam and water.
2. Another Boiler, in which the heat is conducted thro' a number of flues passing thro' water.
3. An improvement on Savery's machine or engine for raising water by means of steam, which improvement consists in:
   a. Interposing *oil* between the *cold* water and the steam, to prevent the condensation of the latter.
   b. Opening and shutting, by means of machinery, the cock for admitting and discharging the steam.
4. Working a forcing-pump, by means of steam, in order to supply the boiler with water.
5. An application of the power of steam to raising water, not before known or used. That is to say, a Piston is made to play up and down in a cylinder by the admission of steam into each end thereof alternately. The rod of this piston, descending perpendicularly into a well, is connected to the piston of a forcing-pump constructed so that the water shall be admitted into and expelled from each end of the same cylinder alternately.
6. An application of steam to the purpose of working a bellows, precisely the same with the above, excepting only that one fluid is substituted for the other; viz: Air in the place of water. An application of steam not before known or used.

After two or three months of further delay, the first dozen of United States patents—among which was the colonel's—was issued on August 26, 1791. Reading these patents, it is hard to believe that engineering ever could have been so

primitive; but, once that basic fact has been accepted, they loom up like signboards on the engineering highway.

By the time his papers had reached him, the colonel was facing the problem of providing for fast-growing children of both brain and body. He wanted more capital to build new machines for experiments; Rachel needed more capital to keep the nursery up to date. On January 29, 1790, she had added James Alexander Stevens to the villa family; barely two years behind James came another son, Richard, with Francis Bowes Stevens following shortly. These must have been the influences that led the colonel to indulge extensively in the common practice of buying lottery tickets —something he regarded as entirely distinct from betting. There was always a street to be paved by some municipality or a church needing a new steeple and more pews—most lottery players being devout churchgoers and such schemes for raising money being duly authorized by law. St. Peter's at Amboy, for one, sold the Honourable John a half dozen tickets that finally passed into the colonel's hands—and remained there—while plenty of other opportunities came his way without bringing him a grand prize. Only trivial amounts could have been at stake when he wrote to an Amboy friend that Rachel was "apprehensive lest the time for payment expire and begs you will hand the enclosed tickets to my Uncle Richard to collect."

Had the colonel won any considerable sum, he would promptly have spent it upon another engine. As matters stood, he used all the funds in hand and whatever he could raise by mortgages on the Hoboken acres. Outside the small circle of the very wealthy, money was extremely hard to find; even inside that circle wealth was more often represented by vast acres than by actual bank balances. Consequently, the colonel fell into the prevailing custom of giving

THE LIEUTENANT GOVERNOR declares he will do nothing in Relation to the STAMPS, but leave it to Sir HENRY MOORE, to do as he pleaſes, on his Arrival. Council Chamber, New-York, Nov. 2, 1765.

By Order of his Honour,
Gw. Banyar, D. Cl. Con.

The Governor acquainted Judge *Living ſton*, the Mayor, Mr. *Beverly Robinſon*, and Mr. *John Stevens*, this Morning, being Monday the 4th of November, that he would not iſſue, nor ſuffer to be iſſued, any of the STAMPS now in Fort-George.

Robert R. Living ſton.
John Cruger,
Beverly Robinſon,
John Stevens.

The Freemen, Freeholders, and Inhabitants of this City, being ſatisfied that the STAMPS are not to be iſſued, are determined to keep the Peace of the City, at all Events, except they ſhould have other Cauſe of Complaint.

THE HONORABLE JOHN STEVENS OPPOSES THE STAMP ACT

(*page 39*)

promissory notes-of-hand, for various terms, which circulated under a blanket of successive indorsements and passed current for the necessities of life as well as for business deals. This was a convenient method; but through such a cloud of personal paper it became very hard to see who was actually in debt and to which creditor. In the colonel's case it finally led to great complication of his financial affairs; always very rich in land, he was often hard pressed for a few hundreds in cash. And in this respect he was not much better off when, in May of 1792, he lost his father.

The Honourable John's long record had won him many friends and relatively few enemies. But the money he had from time to time advanced to Continental soldiers had not been repaid him; and his meadows had not infrequently been battle-fields. At the end of the Revolution his strong-box was one of many crammed with practically worthless paper money—seven-dollar bills and seventy-dollar bills which he might as well have used to light his fires at Lebanon. As a generous brother, he had helped every member of his generation, no matter how often a claim had been made upon him, while to his children he had always been liberal. As a figure in public life, he had kept his house open to guests and his position in the community at full front. Though wide acres brought him some rentals, these were often in the form of crop-shares, which meant, in bad years, that he had to wait. Some lands, too, were so far apart that he could not visit them sufficiently often to prevent depredations such as that which induced a woman tenant of his to "walk all the way from Newfoundland (N. J.) to Hoboken, to report lumber-thieves on the wood-lots." Yet though he was empty of pocket in ready cash, he was full of honors. He had been trusted by the most suspicious Indians, consulted by generals and governors, and relied upon as security for the

public funds. When he was buried "beside the Frame Meeting House, near Lebanon," he had fairly earned his title, "The Honourable John Stevens, Gentleman."

In administering the real estate left by his father, the colonel sought the help of Samuel Stockton. It was Stockton who first spoke of the colonel as "in something of Martha's situation—having to care for many things"; an apt suggestion, since the colonel was certainly of those sons of Martha, the engineers who "transport and deliver duly the sons of Mary by land and main." As agent, Stockton frequently made his reports to his principal in a light vein:

> You will remember that Kitty [Mrs. Stockton] in the multiplicity of her house-demands for loaf & brown sugar, tea, coffee, candles, brandy & gin, keeps a hawk's-eye on your money. And on our going to Phila. she could resist no longer but perched her little talons on it & flew off to Phila. where, before I could call her to strict account, she had spent every farthing of it but a five-penny bit. However, I have received some small matters since, so I was able to honor your draft.

Chancellor Livingston, whose association with the colonel was very close, would soon catch "steamboat fever." The earliest of his many letters of this period were, however, chiefly upon agriculture or the international situation. Having been somewhat neglected in the most recent distribution of political plums, the chancellor was in no optimistic mood when he wrote the colonel in October:

> Mr Labigarre speaks very highly of your mulberry trees —mine have been neglected and promise little. What think you of French affairs? The cause of Liberty will have much to contend with in the ignorance and precipitation of the Convention; it will, I hope, finally triumph. It certainly would have done so in easier times, had not the madness of the young Jacobins or Maratists excited those dangerous commotions which now convulse the nation. All I dread is that the people

may be wearied out & seek in tyranny a permanent refuge from anarchy.

I have just been reading Mr Genet's letter to Gov. Moultrie. Has he not neglected a fair opportunity of confounding his adversaries by denying the charge publicly, as I am told he does privately?

The position of the scheming representative of France had become somewhat less in doubt when Stockton, in January, 1794, wrote to Hoboken:

I have just received, from a gentleman of my acquaintance, an important piece of news which I trust may turn out to be true. It is that the vessel, sent by the President to France some time ago, has returned & is at Marcus Hook; that she has brought dispatches from the Convention of France, disapproving of the *Instructions* given by the Council to Mr Genet, & approving of the constructions put on the treaty with France by the Pres't, & of Mr Jefferson's reasoning on it. We shall hear more of it soon.

In kind, and at his usual length, the colonel replied to all such letters. But he put more personal and local news in letters to his mother, then wintering at Clermont.

February 17th, 1794

My dear Mama

I have just this moment received your favor, which by an endorsement made by the Postmaster must have been written before the 13th. . . . I am extremely happy to hear that you are all in good health . . . but you say nothing about when we are to expect you in town. . . .

A vessel arrived here on Saturday from Amsterdam in 50 days; she brings an account of the retaking of Toulon, but in an indirect manner. However, there's little doubt the event will soon take place, as the French have an immense Army employed in the siege. I see by the paper today an account of a very bloody action between the Prussians and French, in which the Prussians confess they lost 11,000 men and were

under the necessity of removing the Military Chest, etc, expecting another attack.

New York never was so gay as it has been this winter. Two or three private Balls or Parties for every night in the week—besides plays, concerts, Assemblies, etc. We have been to only one play this winter, tho' at several private parties but not to any dancing. We were at a superb entertainment at Mrs John Laurence's on Friday evening, where everything was conducted in the most elegant stile. Mary Cox counted no less than 24 spermacetti candles, besides four patent lamps, in the Supper Room, and the Drawing Room was a mere blaze of light.

There is an elderly gentlemen here from the West Indies with a fortune of one hundred and fifty thousand pounds sterling, who keeps neither horse nor servant, so is at great loss how to spend his income. But the ladies have kindly put him in the way. He has already given one Ball but is to give another tomorrow night at the Belvedere House, to which 500 people are invited, and which, from the accounts we hear of the preparations, is thought will cost him 1,500 or 2,000 dollars. It is said he means shortly to give another, to the little Misses. Betsy and Peggy must make haste to town or they will miss it. The gentleman's name is Beese. This is a very trifling news, but I thought it might amuse you to know what we are about here.

Twenty-four spermaceti candles just then had a special significance. The candle-makers of Rhode Island had organized what was the first American trust; only the upper crust could so lavishly scatter candles about their supper-rooms. Mr. Beese, no doubt, could do it—as long as the ladies' help lasted. That help must have been efficient, for he left no imprint upon the city's commerce, nor does it appear that he invested any money in behalf of any inventor badly in need of capital.

However, more serious than the lack of ready cash was the other obstacle confronting every early engineer—the absolute dearth of competent mechanics. Opportunities on

this side of the Atlantic had been so rare that Englishmen trained to a trade preferred to hunt out and fill the openings at home. When American mechanical enterprise was first born, few Englishmen heard its faint cries and fewer still cared to cross the ocean to answer them. Later, they were to cross in shoals—after many an American idea, for lack of a trained hand to execute it, had come to nothing. The forges and shops that existed here were unbelievably crude. If a tool of special shape appeared to be needed for a particular job, it was roughly hammered to a poor edge and poorer temper, with scarcely even a name to distinguish it from the other oddities among which it lay. The modern workman, surrounded by machines of almost human intelligence and of much more than human accuracy, recoils with horror from the "finished piece" of his long-buried predecessor. Yet, because the old-timers actually got their parts together and made their machines move in spite of leaks and knocks, that same modern artist might do worse than study the days when what he calls "a thousandth clearance" was commonly known as "within the thickness of a worn shilling." As Robert Louis Stevenson said of the end of the eighteenth century, "engineering was not a science then—it was a living art!"

Facing the prevailing difficulty, the colonel was further hampered by having had no training for his own hands. He could design a boiler or make engine-drawings sufficiently "working" in character to be followed to-day. With his own hands he could not build the boiler or the engine. To make up for this lack he pored over every book dealing with fundamental principles as thus far understood. Descriptions of every effort in steam, from Savery to Newcomen, were constantly before him; on almost any night, the account of James Watt's experiments could crowd the Bible from the

table under his bed-candle. If he could not build anything, he must at least know how it should be built. When Robert Livingston asked casually, "Have you seen Dr. Priestley's new work, or read Count Rumford's account of his last experiment?" the colonel would clap on his hat. Hurrying down to the foot of his lawn, he would leap into the always waiting periagua and shortly be making the rounds of the city bookshops. Failing to find what he wanted, he would not let the day die without posting an order to the Strand or High Holborn, directing instantaneous shipment of the book in question. He believed in books for everybody; but it was less to this good purpose than in order to miss nothing himself that he took shares in the New York Society Library, just then organized by Samuel Jones and Isaac Kip. To the same end of keeping up with the times, he became a charter member of the Society for Establishing Useful Manufactures in New Jersey, originally headed by the Boudinots.

Study did much for him, but still left him compelled to employ any mechanic at hand. One of the earliest of these was John Hall, of relative ability but of quite undependable personal habit. Unfortunately for Hall, the most telling thing that has ever been said of him was the colonel's regretful remark that he was "a confirmed sot." But of the work in hand there is some record in the colonel's instructions to Hall:

> Upon reflection, I should suppose it would be most convenient to make the piston of cork, with a plate of iron of sufficient strength on each end; the rod passing through the plates and cork and fastened with a nut and screw. As the engine is to be but small, perhaps it would be best to make the wheels and cogs, the rods and teeth, all of wood. However, I suppose it would be necessary that the teeth attached to the piston, and the small wheel which works therein, should be

made of iron. As soon as you have prepared the models for the castings, please to let me know, that I may pay attention to the casting.

In his anxiety to "build something that will run" at least sufficiently well for demonstration, the colonel was not too greatly concerned with the lasting quality of material nor with mass production. Pistons of cork and cogwheels of wood! From these unpromising seeds have sprung the enormous plants that give forth a motor-car or an aëroplane in a mere matter of minutes. In 1793, even the boring of a cylinder was a complicated affair, involving, according to Hall's bill for doing it, such items as "Pd. for four pints of spirits given to labourers while boreing, 4 sh."; while his letters to the colonel indicate something of the other problems they were attempting to solve.

I should be very glad if you could inform me what thickness (or depth) from the underside of the frame on which the Machine is fixed to the underside of the Boat, as I want to know the length of the Spindle that must pass thro' the bottom . . . in order to work the forcers.

The cedar poles are not yet come over; they are very much wanted in order to have the whole finished, which will be in a very short time except I am very much disappointed in my expectations. As soon as I can get the Iron work done, shall get it fixed so that an experiment may be tryd in about 2 or 3 weeks if there should be nothing more than I can foresee.

What Hall failed to foresee was his own inability, before this engine was completed, to pass along all the pints of spirits drawn to encourage the workmen. Too many remained between his own hands; in a fury, the colonel discharged him.

CHAPTER SIX

To reconstruct in imagination the noisy, ineffective steam-engines of the seventeen nineties is scarcely harder than to picture New York and Philadelphia annually scourged, during the same period, by yellow fever. What in one case was known of thermo-dynamics about equaled what in the other was known of medicine. The aëroplane and the cleaning up of the Canal Zone are near enough to one another in date to represent goals reached through equally long struggles from a blind start.

All the doctors of old New York had pet theories to account for the scourge. Without suspecting the mosquito, they blamed vegetable putrefaction, sudden changes in temperature, bad water, and a dozen other causes. From every point of view long essays were written and distributed, none of these interesting Colonel Stevens as much as that issued in 1795 by his friend Dr. Samuel Latham Mitchell. He held Mitchell to be what others called him—"the Franklin of New York, giving scientific reputation to the whole State; deeply learned in physics and chemistry, and an authority upon natural history and botany." Hence, when Mitchell wrote upon contagion in fever and upon the importance of recent researches into the effects of carbon-oxides as generated by animals and men, the colonel's attention was caught. "Because of this ingenious essay," he declared, "mistery and vague conjecture must soon give place to certainty and science." If the doctor's theory of contagion proved just, "a flood of light must soon be poured in upon us," while

the "speedy discovery of the means of preventing the ravages" would inevitably be "the happy consequences" of the doctor's "learned labours." Begging "indulgence for a few crude and hasty remarks," the colonel wrote Mitchell a letter of many pages. Why, he asked, should yellow fever and ague and fever be attributed to *precisely* the same causes, when the former, confined wholly to cities, was so very contagious and the latter, prevailing chiefly in country districts, was attended by so little contagion? If the two fevers had the same origin, why should medical men recommend "total abstinence from animal food and spirituous liquors" in one case, while advocating "a more generous style of living" in the other? Question followed question through the letter, but at the end the colonel made a suggestion which has no precedent in available records:

> An idea has just struck me. It is that temporary stages be fraimed of dock-logs and moored off the City at a convenient distance from the wharfs. On these, suitable apartments might be erected for the reception and accommodation of the sick. In order to prevent, as much as possible, the accumulation of contagion, let these stages be multiplied as much as they conveniently can and placed at proper distances from each other. The most important benefits would probably result from such an arrangement. . . .
>
> As the removal of a sick Person to a Hospital of this kind would probably prove extremely salutary to him, there would remain no reluctance either on the part of the sick person or his friends; and thus the efforts of the police to separate the sick from the well, so far from meeting opposition, would be aided and assisted by everybody.
>
> The opulent, as a necessary precaution, would no doubt provide hospitals of this sort at their own expense. Thus situated, every comfort and convenience might be afforded the sick and their friends might attend upon them with scarce any apprehension of danger. These aquatic Lazerettos might also

be employed in another way, probably to great advantage. The air of the City during the hot season is extremely injurious to young children. Vast numbers are carried off every year during the summer season by disorders of the bowels. It is truly astonishing what an immediate effect removal from the foul air of the city has on infants labouring under these complaints.

As is the case with other ideas originated by the colonel, we no longer find the benefits of floating hospitals astonishing; in fact, we could not do without them. The conception very probably came to him from Rachel, who constantly kept before him the necessity of protecting infants. On the twenty-eighth of July, 1795, she presented him with a sixth son.

Edwin Augustus Stevens, compared with his several brothers, proves to be a little less gifted than Robert as inventor; not so enthusiastic a *bon vivant* or so inveterate a yachtsman as John Cox; and never so successful a fisherman as James. With some of the qualities of his father he combined a share of those of each of his brothers. Considering the family as an assembled machine, in which the colonel and Robert were the high-speed gears, Edwin became the flywheel that, on a dozen occasions, kept the machine from tearing itself into a thousand fragments. Organizer, financier, refuge of his family in every emergency, but for him there would have been little left of the great Hoboken estate and certainly no such permanent memorial as the college he founded. Measured by what his father wrote of genius, Edwin was less "fine-edged," yet no phrase could better describe him than the "sober common-sense and strict attention to business" which the colonel held essential to regulating the affairs of the world. Marking his birth is a letter to the colonel from Chancellor Livingston:

Clermont, August 30th, 1795.

I congratulate you and Mrs Stevens upon the increase of your family. I flatter myself that you will go on as you have begun—at least till, like another Apollo, you beget another Aesculapius. The next, I think, will be a physician by birth.

I did not doubt that we should agree on the subject of the treaty [with England] which I find we do, by your observations on CATO, who speaks very much as I think. But I am at a loss to conceive how you sh'd suppose that I, who love upon all occasions to play the young man, sh'd think of wrapping myself in the mantle of the old Roman senator!

The more I have considered the abominable instrument, the more I am shocked at the dangerous spirit which dictated it. Unless its evident unconstitutionality shall prevent Congress from confirming it, I think the sun is set upon the prosperity of this country, as far as it is connected with our commercial navigation. I wrote to the President upon this subject as soon as the treaty reached me, & have since rec'd a polite note from him, in which he tells me of his intention to ratify it, & assigns as his reason that, tho' it does not do all we wish, yet it is sufficiently advantageous to render the ratification advisable. I also have a letter from Madison on the same subject; he assures me that all parties in that state unite in reprobating it. Monroe, in a letter of the 23 June, complains heavily of the manner of its having been negotiated, of Mr Jay's refusal to communicate it to him, tho' he sent an express to England for that purpose. They had not then known its contents in France but were greatly agitated about it. He says if the terms are not favorable to us the negotiator will be unpardonable, as there is nothing so much dreaded by England as a war with America & as France was ready to make common cause with us in case we had made no advances to England. He assures me that everything in France is as the most sanguine Republican would wish; that the last convulsion, tho' blown up by Royalists, has—from the conviction it afforded them that the revolutionists intended to restore the system of blood —united them to the existing government, which is now stronger than ever. Spain, he represents as on the eve of a

peace. The Emperor is negotiating one & England has, thro' Mr Edin, made overtures.

The hailstorms we have had here have destroyed all my agricultural improvements, so that for this year I find myself descended to the humble state of a politician. If your house is finished on the plan you once showed me, it must make a very handsom appearance from the river, as well as afford you the comfort of a great deal of house room—a very agreeable circumstance in the country. Do let me know when the Proprietors meet, as I wish to attend but have forgotten the time in Oct.

From Mitchell on fever and from Livingston on politics, the colonel turned to letters from John Fitch, that unfortunate visionary whose odd-looking craft, crawling down the Delaware under steam-driven oars, rank among the very earliest American steamboats. His quarrels with Rumsey combined with his own disappointments, poverty, and obscure death to cast a shadow over him which not even Westcott as biographer could wholly lift. Little is known of his precise activities at the moment when he was writing to the colonel—at first apparently to borrow money.

I, the subscriber, for value received, do promise to pay to John Stevens, Esquire, twenty dollars on demand. I also promise to make Conveyance of, to the said John Stevens, if required in Eight Days from this time, four-tenths of the Patent Rights of the Horse Boat on the North River and Rariton River, which said Patent belongs to me and Henry Voight in partnership. This I promise this 11 Day of April, 1795, as witness my hand

John Fitch.

The colonel, somewhat doubtful of the effectiveness of horse-boats, addressed an inquiry to Matthew Barton of the Pennsylvania legislature. According to his reply, Barton "called on Mr Henry Voight, a very ingenious man," to be

told that Voight himself was the inventor of the boat and the real owner of the patent. Voight did not, however, "believe he should ever derive any advantage from it; the Boat, in its construction, being very expensive and requiring four horses to work it." As to the rumor that it had made a trip from Philadelphia to Trenton, Voight insisted that this journey had been performed, instead, by Fitch's steamboat—a statement in which other records bear him out. "Upon the whole," said Barton of Voight, "he spoke of it as an invention more to be admired for its Novelty than for any advantage that could result from it." All this was convincing; but the colonel pursued the matter a little further by writing to John Nicolson, to whom Fitch had also referred him:

> Mr J. Fitch called upon me a few days ago with a proposition of being concerned with him in erecting . . . a Horse Boat. He at the same time informed me that he had conveyed to you the greater part of the interest in the Patent he had obtained therefor; that in consequence of this, you had completed the construction of a boat . . . which had performed a voyage to Trenton and returned . . . to Philadelphia in the short time of ten hours.
>
> My reason for troubling you on this subject is that, being the proprietor of the Ferry from South Amboy to New York, if there really is a prospect of this invention being usefully applied to the propelling [of] passage boats, I might possibly be induced to take a concern in the business, upon such terms as would prove mutually beneficial. I, therefore, take the liberty of enquiring of you what has been the results of your trials and experiments of the Horse Boat. And, in case the project should be feasible, whether you incline to be engaged in the construction of a boat to be built here.

At the same time he wrote to Dr. Ben Say of Philadelphia. "What," he asked, "are the boat's defects and why has it

not been used as a passage-boat?" Dr. Say could give little information, because, as he wrote, he had not been greatly interested and hence had "not attended the works" during the building. He had, however, "seen her at work, last fall, when she appeared to get along with some reputation tho' the tide was then against her." She was, he added, "a double boat with a platform extended across between them, in order to increase the surface—as long, perhaps, as a cleaver-sized raft."

Although the colonel was not encouraged, Fitch was persistent. In midsummer he wrote that his feeling of serious obligation to the colonel induced him to request the latter to take "a share in a business which cannot fail to become lucrative." The new boat he proposed building would be much as Dr. Say had described the old one—that is, really two boats, fifty-five feet long and seven feet in beam, bolted together by "sundry timbers" five feet long. Fitch thought the distance between boats should be such as to permit their supporting a circular platform of twenty-one foot diameter, upon which the horses—or oxen—were to walk. For machinery, Fitch contemplated "a cog-wheel of 21 foot, moved by the horses, to operate on the cranks, the shaft of which was supported at top by a light fraim with 6-inch posts." The horses were "to work on arms fixed at the top of these shafts; of course, their strength would be principally laid out on this fraim and, had it been placed on land, it could not long sustain the draft of four horses." As an alternative, he offered a plan calling for only one boat—a sixty-five-footer of fourteen foot beam and four foot six draft. "This," said he, "will take into the boat a 13 foot wheal, supported just under the wheal by four stout friction wheals; the arms for the horse to be bolted at the top, and these friction wheals may be screwed up to the shaft with such

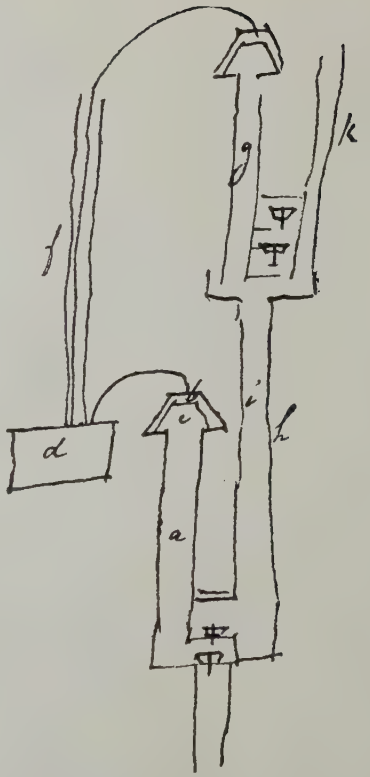
nicety as to keep the [main] wheal perfectly steady." In a burst of enthusiasm, he declared that "this, Sir, is as impossible of failure as that four horses would fail of drawing a wagon . . . and on this opinion" he would "pledge the mechanical reputation of John Fitch." Let him but superintend the business and he would ask only "a moderate sustenance." To all of which he begged an early reply, as he planned to stay at Sharon, New York, until he should "think it time to set about the business in order to have a boat compleated by the first opening of the spring of 1796." Even when he got no reply at all, he wrote again, quoting the earlier letter and discussing the general proposition for the Hudson River:

> On the supposition that there was 100 chances to 1 of its not answering the desired purpose (which I cannot admit) and [supposing] the Boat to make a voyage from Albany to New York in two days, being so unfortunate as to have but 15 passengers on board at 3 cents a mile, and only run 262 days in the year—yet the boat would earn fourty thousand dollars. This, in ten years during the patent right, would amount—as Mr Steaphen's half-part—to two hundred thousand dollars.
>
> But, even should it be possible that we could or did miscarry, the risque of loss would not exceed seven or eight hundred dollars; there would be but trifling loss excepting only of the machinery of the Rowing works. Say the loss to be 800 dollars; the promise of success, after deducting one-half for the chances, is two hundred and fifty times the sum. But an Impartial Estimate would be five hundred times. If it is justifiable for men to risque money in a lottery at 12½ per cent, how much more would it be in this, where nothing but able mechanicks is required to make the prize sure?

In still another note, dated a few days later, Fitch repeated his intention of having a boat ready for spring and added that he "wished Mr Stevens to have the honours and

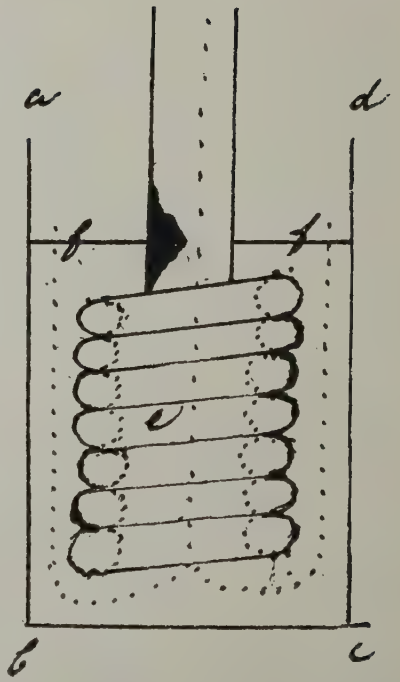
emoluments of it." He meant, he declared, "to make a conveyance of one-half the patent right on the North and Rariton Rivers to the person who will take me by the hand so far as to get one boat agoing compleat." Again he begged for an answer, to be sent through his friend King "at Mr Barneybus Rappleyear's near Coonches Dock"—meaning, presumably, Coenties.

Had the colonel gone into the business, he would certainly have left a record of it. Hence he obviously had no share in the grant Fitch had received from New York's legislature in 1787—the exclusive right to run steamboats on the Hudson, under which right the year 1797 has been generally accepted as that in which Fitch made his demonstration on the old Collect Pond, over the site of the Tombs prison between Catharine and Franklin Streets, New York. John Hutchings, describing himself as "a mere lad" hired by Fitch to steer this boat, insisted that both Chancellor Livingston and Fulton were on board her and that Fitch explained the *modus operandi* to Fulton. "From hearsay," added Hutchings, "I believe that Colonel Stevens of Hoboken and another person by the name of Rosevelt had some knowledge of the enterprise." Undoubtedly it is true that the colonel never would have missed such an event; but if Fulton was there, then all the biographers who have placed him in Paris at the time must have been mistaken. Yet how could Hutchings, who spoke of often seeing Fulton in after years, have confounded him with a man so utterly unlike him as was the colonel? The exact facts are not available, for Hutchings was, after all, writing his account from a memory that might have played him false. As far as Fulton is concerned, it does seem unquestioned that he heard all about Fitch's boat when his great friend Joel Barlow gave him the latest news of American progress in steamboating.



THE TWO-STAGE PUMP

(*page 150*)



THE COIL BOILER

(*page 101*)

TWO EARLY SKETCHES BY COLONEL STEVENS

Certainly the efforts which the colonel had for years been making received fresh impetus not only from Fitch but also from Captain Samuel Morey, the most interesting of the early New England experimenters. According to Guy Hubbard's interesting story of him, Morey began in 1790 and received his first patent for a boat in 1795. Some twenty years later, when William Alexander Duer was attacking Colden's biography of Fulton as a prejudiced claim for all steamboat inventions, Morey sent Duer a letter with evidence to the contrary. Dated October 31, 1818, it described some early experiments and continued:

> . . . The next season [1796] . . . I went again to New York and applied the power to a wheel in the stern. . . . I invited the attention of Chancellor Livingston and he, with . . . Mr Stevens and others, went with me from the ferry as far as Greenwich [Village] and back, and they expressed great satisfaction in her performance.

Morey added a description of his next year's effort at Bordentown, using two wheels at the sides instead of one at the stern. Since the colonel was constantly coaching through New Jersey, he undoubtedly saw Morey's boat and discussed it with the chancellor and also with his new associate, Nicholas J. Roosevelt, brother of the late President's ancestor. Roosevelt was already interested in the Schuyler foundry at Second River, the town now called Belleville on the Passaic. Several men recently out from England were at work there; as mechanics, they might be presumed to know something of British steam-engines. One was Charles Stoudenger, later to become Fulton's engineering foreman. Another was Rhode, future preceptor of James P. Allaire, the man whose plant was to build many engines in the early eighteen hundreds. A third was the draftsman and pattern-

maker, John Hewitt. Roosevelt was certain these men could construct an American design of engine at Soho—the Schuyler plant being so named in honor of Watt's works at Birmingham. Like the colonel, Roosevelt felt that the first essential would be to make sure of Livingston's co-operation. Legislation might be needed, and there stood the chancellor, his pockets fairly bulging with potential votes at Albany. Since he was connected, by profession or by marriage, with all the most prominent men and women of New York, not a governor of the State—much less any assemblyman—could afford to ignore him. He was too close to the throttle of a political machine which, when it did not actually run the ship of state, was always warmed up and ready to do so. Livingston must by all means be persuaded to join the enterprise.

At the first three-cornered conference it became evident that the chancellor would come in only upon the condition that the boat and engine should follow his own design—one no longer wholly approved by either of the other two men. When Stoudenger, chosen as foreman, saw the Livingston plan in December, 1797, he shook his head. "I'll make the drawings," he said, "and I'll build the boat exactly as he wants it. But don't blame me if it don't work!" He did not like Livingston's clinging to the scheme of lifting water through the bottom and expelling it at the stern—the idea credited to Franklin by the colonel but no longer approved by the latter.

Later, the chancellor's vote was for a water-wheel, hung under the keel horizontally and driven from the engine by a vertical spindle. The truth is that Livingston was not as practical as any of his associates. As a combination of gentleman-farmer, judge of vintage-wines, epicure, politician, and diplomat, he was a distinguished man. But as an

omnivorous reader of books, with some latest work always in hand, he was apt to reach the final page with a firm conviction that the last word had been spoken upon the particular subject, even though that word might contradict another he had just read with equal confidence. Hence he was often led astray in his ideas of steam-engines and always sure that his last path was the best. What he insisted upon building was described in his letter of January 22, 1798, sent to Roosevelt at Soho:

Let her, on the widest part, not exceed ten feet 2 inches; in the narrowmost, where the wheels are placed, 9 feet 6 in. Instead of making her sides five feet, make them only three feet high. Let her bottom be made of oak plank as well as the bow; the sides only of pine or cedar. Let the timber be as light as possible, except in the stern where it is necessary to fix the machinery. The knees may run six inches above the gunnel round the bow, to which ½ inch planking may be nailed so as to prevent the spray from washing too much over her. Let her be floored with only inch boards. In short, every measure must be taken to make her as [so?] light as not—when not loaded and without her engine—to draw more than 3 inches water.

The water-wheels may be reduced to four feet and a half and the plank run past the center of the well so as to make all power act directly. The keels not to exceed three inches by four, each, as even they will be great obstructions.

Every means should be taken to lessen the weight of the machinery. If the fly runs 3 times at a stroke it need not be large or very heavy; I sh'd suppose 400 pds. sufficient and do not see, in that case—as the cog-wheels will not be more than two feet—how the whole engine can exceed three tons. At least, I think it may be brought to that by using wood where practicable. At all events, we must manage it so that the boat, engine, & fuel do not load her more than six inches; so that, when she has her fly & engines on board, she may not draw more than one-foot water. In this case she may be made to go eight miles an hour, which will fully answer our purpose.

On the following day, in another letter to Roosevelt, he made a point of saying: "I adhere to this plan. My Brother's plan I have not seen but, if it consists in having *two wheels turning toward each other*, I have it under consideration and prefer the one I have fixed." This was a disappointment to the "Brother," for the colonel was already at work upon his own idea of a wheel in the stern rather than under the boat or at its side.

During the winter, before actual building began, Livingston had bestirred himself over a bill to secure steamboat rights on the Hudson. Dr. Samuel Mitchell introduced this bill at Albany and at the end of March it became law. As passed, the grant began by repealing the previous law in favor of Fitch, by which the latter was given "the exclusive privilege of constructing, making, using, employing, and navigating all and every species of Boat or watercraft which may be urged or impelled by the force of fire or steam, in all creeks, Rivers, Bays, and waters whatever, within the boundary and jurisdiction of this state for and during the full end and term of fourteen years from and after this present session." Although Fitch, under this sweeping authority, still had three years to run, he had made no real effort to do so. Every one believed him dead, and Westcott says that he was dead. At all events, his entire rights were transferred to the chancellor upon the condition that the latter, within twelve months, should produce "such proofs as would satisfy the Governor, the Lieutenant Governor and the Surveyor-General of the State" that he had a boat of at least twenty tons, "capable of proceeding with or against the current of Hudson's River at a speed of not less than four miles an hour." It was further required that when—or if—Livingston succeeded, he should keep a boat

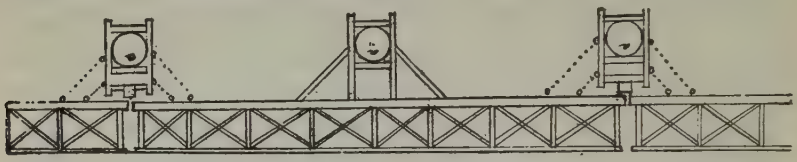
plying between New York and Albany—under the conditions, a magnificent opportunity.

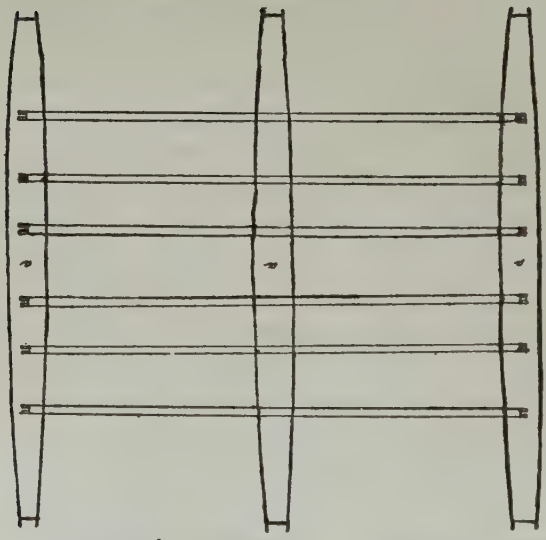
Only a small share in the proposed boat was allowed to Roosevelt. "You have," the chancellor wrote him, "12/100 in the patent rights and also in my rights under the [state] law; with the exception I mentioned to you, of all ferries to the New Jersey shore; to prevent any interference with my ferry or Mr Stevens', the *exclusive* use of boats to which, we claim." At this stage of the proceedings the colonel's ferry rights formed a point with the chancellor far more tender than it afterward became.

Under the not very propitious circumstance of promoters in disagreement on design, the work of building—begun that spring at Second River—progressed but slowly. The chancellor, impatient over every delay and resentful of every call for more money, exclaimed, "Had I anticipated this, I should have imported a Bolton Watt engine from England." In the fall he went so far as to send an inquiry to England, proposing to buy "a 24 inch cylinder, making four feet strokes" with "the furnace only, for a wooden boiler." This letter, quoted by H. W. Dickinson from the Boulton and Watt manuscripts, indicates the chancellor's overconfidence in his own influence, for, through a long period of years, only three engines were permitted to leave England. One went to France for the pumping-station at Chantilly; a second came to America for Aaron Burr's water company, and a third was the one Fulton, after long negotiation with the British authorities, succeeded in bringing over for the *Clermont*.

Work at Soho having in the meantime progressed, the horizontal wheel almost immediately proved a failure, inducing the chancellor to try something else. The colonel

then designed a set of elliptical paddles, to be driven by a Boulton and Watt engine as understood and built by Stoudenger and a new assistant, Smallman. To superintend, Roosevelt remained at Soho, while the colonel frequently





THE COLONEL'S DRAWING OF A FLOATING BRIDGE

drove up from Hoboken, and the chancellor, at Clermont, continued to be impatient. In June he wrote the colonel:

I still anxiously expect the fruit of our labours in seeing you arrive here at the rate of five miles an hour. . . . Mr Dela-

beyarre has prepared his battery to give you a salute when you pass Red Hook.

To the actual trials on the Passaic all the notables were invited, among them the Marquess d'Yrujo, Spanish minister to the United States. This dignitary estimated the speed at "upwards of five miles an hour," but the colonel and Roosevelt were not inclined to claim more than three and a half. With this particular trip we had, until quite recently, a living link in the late Mayor Abram S. Hewitt of New York. The mayor was the son of John Hewitt, the pattern-maker of Soho, and therefore able to quote his father's words in telling the story:

> There [to Soho] John Stevens came and built the first low-pressure engine. He himself ordered and paid for the first non-condensing double-acting engine that was built on the American continent. That engine was put in a boat in which I traversed the route from Belleville to New York and back again; John Stevens being the owner, builder, and captain of the boat; Mr Smallman, Mr Rhode, and myself being the passengers. And we came to New York in that boat nine years before Fulton put the *Clermont* on the Hudson.

John Hewitt gave this account just after he had taken Abram—a boy of six—over to Hoboken to meet "the greatest engineer of his time." The mayor himself said: "I was introduced to John Stevens, then eighty-three years old but in possession of all his faculties. He called my father 'John' and they began to talk of old times and particularly of this remarkable story. It was often repeated to me by my father, or I should not remember it so well." Having seen the boat itself, Mayor Hewitt recalled it as "having a wheel in the stern"; hence it was evidently that one with which the colonel and Roosevelt were not fully satisfied.

John Hewitt quoted the colonel as declaring that the wheels should have been at the side—an opinion in line with Roosevelt's. Among the colonel's own papers is his criticism of the excessive vibration, causing the piping to leak and the boat's seams to open. In his opinion, a radical defect in the engine was the "alternating pressure," which he discussed at some length.

It may, perhaps, be necessary to subjoin a few remarks, in order fully and justly to appreciate the great magnitude of the alternate pressures on the cylinder upwards and downwards at each stroke of the piston. Setting aside friction, the piston may be considered as working loosely in the cylinder. If, therefore, a vacuum be formed on one side of it, and an elastic fluid be introduced on the other, a partial pressure will take place against the exterior and interior surfaces of each end of the cylinder. The one end will have to sustain the pressure, whatever it may be, of this elastic fluid gainst the interior surface, counteracted by the pressure of the weight of the atmosphere on its exterior surface. The other end will have to sustain the pressure of the whole weight of the atmosphere on its exterior surface, without the counteraction of any pressure on its interior surface. Should, therefore, the pressure of this elastic fluid be less than that of the atmosphere, the difference will be the amount of the partial pressure. Should it be greater, the excess added to the pressure of the atmosphere will constitute the whole partial pressure.

We will suppose, then, that the steam has an elasticity sufficient to raise a weight on the safety valve, equal to eight pounds on the circular inch; and the pressure of the atmosphere is estimated at twelve pounds on the circular inch. The whole partial pressure will then be, alternately on every circular inch of each end of the cylinder, equal to twenty pounds. On a cylinder, then, of thirty inches diameter, making only fifteen double-strokes per minute, there will be an alternate pressure upwards and downwards—changing every two seconds—of no less than 18,000 pounds. No strength of timber in a boat

could withstand the enormous strains which such a pressure, changing, too, so frequently, would occasion.

Believing this to be the most serious shortcoming in the American Watt engine, the colonel redoubled his efforts to design something better. Roosevelt, for his part, next proposed to the chancellor that they "throw two wheels of wood over the sides, fashioned to the axes of the flys, with 8 arms or paddles." He recommended that "the part which enters the water" be made of sheet iron and so fitted that it might be shifted up or down "according to the power they require." This might serve to drive the boat until a larger engine, which Roosevelt considered desirable, could be built. A little later he wrote Livingston urging that he "could wish your plan to be contrasted with paddles upon Mr Stevens' plan or with wheels over the side, so as fairly to ascertain the difference in the application of power." But the chancellor had no faith in the side-wheeler, and thus it was years before Roosevelt's idea was generally adopted in America. Livingston was always confident that his own scheme—whatever it might chance to be—was the best. To that effect, he frequently wrote the colonel such letters as this one:

Clermont, Feb. 5, 1799

. . . You tell me nothing of your opinion of the last improvement I have made on the engine that I sent you. I have since discovered, as I think, a way to make a complete rotary motion by the common engine, without any loss of power but the friction; so that buckets may eventually be used instead of a ship's pump, with various advantages, & steam engines —even on Watt's plan—be rendered much more useful.

I fear I tire you with my projects, but this is no place for news and, as for the politics of the day, they are too unpleasant to be thought of. It is well we can find sources of

amusement while the winter excludes us from the pleasures of gardening and agriculture.

Never philosophic in temperament, the chancellor was just then nursing a political grudge over his defeat by John Jay in the race for governor. Consoling himself as best he might with steam-engines, his next letter dealt with the colonel's theory that no matter what was finally adopted to give the actual impulse to the steamboat, the proper place for the device would be at the stern. This letter of Livingston's also set forth his idea of the existing partnership.

It is impossible to give you my opinion as to the number and size of paddles, without knowing the velocity you propose to give them or how many will be required for the motion. I do not see why you do not fix on fewer and larger ones; too many small ones will not be convenient. But I dare say you know more about this subject than I do.

As to Mr Roosevelt, I think nothing could be fairer than our proposition. We embarked together in the project with him, on terms of equal risk in proportion to the sum of shares. And, if one scheme failed, we were—if we thought it prudent—to go on with further trials on the same terms. We now propose a second trial; if he wishes to share in one-third, he should stand that share of the expense. For the advantage of *your* invention and aid, you are . . . as far as relates to this . . . upon equal ground with me. That is, one-half of the first expense on one-third of future ones. I am content to join in for 1/3.

Unfortunately, much of this letter is no longer decipherable, but enough can be quoted to show the renewal of partnership. No agreement was put into writing until 1800; after that it became one of the chief causes of the often acrimonious debate that arose some years later between the brothers-in-law.

At this stage in American steamboating, Marc Isambard Brunel presented himself. This young man, born in Normandy and educated at Rouen for the priesthood, had abandoned holy orders to join the French navy. Mechanical taste and real ability, demonstrated when he was only seventeen, had won him almost instant recognition and an apparently assured future at sea. But as an ardent royalist at the time of the Terror he had been forced to fly for his life to America. Naturally planning to earn his living as a mechanic, he applied to the colonel, who was not long in discovering that a place must be made for a young man who knew so much more than the average.

Brunel found the colonel in the midst of an effort to get higher steam temperatures and consequent greater boiler efficiency. Experimenting with primitive "flash-boilers," the colonel was led to something new in engines, of which we have this description:

I do hereby certify that the machinery for propelling a boat, a draft of which Mr Stevens has put into my hands for the purpose of constructing a working model, is not in any part my invention but, as far as I know, altogether an invention of his own.

The essence of which invention consists principally in the following particulars, viz: A piston working in a cylinder and *put in motion by the explosion of an inflammable gas; and is re-acted upon by the pressure or elasticity of the air in the cylinder above the piston.*

This air, as the piston rises, becomes more and more compressed and, in proportion to this compression, its resistance increases. By this means, the motion of the piston is gradually retarded, and must finally be arrested, without violence or injury; let the force of the explosion be what it may.

The explosion is instantly succeeded by a vacuum under the piston and the condensed air, acting above the piston, presses it down again. Thus an alternating or reciprocating motion

is established which, with proper machinery, may be applied to any mechanical purpose. The present application towards propelling a boat is, by means of cranks, to give an elliptical motion to a number of paddles in a mode not hitherto practiced.

New York, January 30, 1798. I. Brunel.

The internal combustion engine originated with Papin and the Abbé Hautefeuille, Frenchmen of about 1680, who used powder explosions for motive power. A century later, in England, John Barber mixed coal-gas with air in a retort, lighted this mixture, and discharged it against a paddle-wheel. In 1794 the explosion of gases ignited outside a cylinder was first used by Robert Street, another Englishman, to operate an actual piston. It is entirely possible that the colonel had studied Street's engine, but his own is the earliest that has been found in any American record. Some further account of it is to be had from a letter written to him by Brunel:

Soon after your going off, I began some experiments on the machine. The heat of the brass cup was sufficient to create the gas. Having injected some Spirit with the Seringe and kept the candle by the hole in the front (I mean the hole which was shut with a little bit of wood) an explosion took place; such a one as to blow water out from the horizontal or square pipe with a great vilence. The fire ruched through all the apertures, though there was but little spirit injected.

I tried immediately a second explosion, which impressed like the first one. I could not get a third explosion, the cylinder being quite full with Smoke. I blowed out all the smock and then tried again. I met with the former success. I proceeded further but, the more I tried, the longer was the time necessary to create another explosion. I found that the bellows ought to have a very large aperture or pipe leading to the Cylinder in order to blow the Smock out. I suppose that is the cause which causes so much delay in the intervals between the ex-

plosions. The explosions don't make much noise, about as much as yesterday, when the gaz-box was open. I will make no alteration until you see the same effect.

The Chance begins to assume a fair prospect.

Your Obedient Servant

I. Brunel.

My men got terrified when, at the first explosion, Smith who set the candle to the aperture was watered by the blowing out of the water.

Much interested by the possibilities of these explosions as a means of increasing engine efficiency, the colonel thus described his ideas and intentions:

After procuring inflammable gas or air, by distillation from wood or pit coal, perfectly pure and separated from all mixture of tar, oils, acids, etc—by means which will be particularly described in the specifications of a patent I propose applying for at some future day—and after mixing the same with a due proportion of atmospherical air, my invention consists in introducing inflammable matter . . . into each end of the cylinder of a steam engine. When the piston in the cylinder shall have moved one-third of the way (or such distance as may be found most advantageous) from the top to the bottom or from the bottom to the top, I set fire to the same, (i.e. the inflammable mixture) thus causing an explosion in each end of the cylinder at each stroke of the piston, up and down.

Of the mechanical means of performing these operations most conveniently, I shall not attempt to give a description, as they may be variously modified and will not affect my claim to the Principle itself; which may be generally stated thus:

The explosion of any inflammable or combustible matter or substance, whether gaseous, fluid, or concrete, in such manner and under such circumstances as that the temperature of a given quantity of steam shall be raised therby, and its elasticity and operative power increased.

The impression made upon Brunel by these experiments was never effaced. Years after he had gone back to Europe

he was still making tests of liquefied gases as fuels and as motive-power, never losing faith in ultimate success. Not all his inventions of shoemaking machines, copying machines, and circular saws, nor his attempt to dig a tunnel under the Thames, could keep him from devoting his spare time to the theory of the gas-engine. His enthusiasm and ability inspired Colonel Stevens to go on until he had built the first ocean-going steamer in history, just as they afterward inspired his own son, Kingdom Brunel, to build the *Great Western*, first steamer to make regular ocean trips. It was a real disappointment to the colonel when Brunel, finding it politically possible to do so, went back to France.

CHAPTER SEVEN

Determined that all his sons should follow him to King's College, the colonel directed their earliest education toward that end. When Robert was twelve and James nine, their father consulted a cousin of his grandmother's, Bishop Provoost, in the matter of a tutor and finally chose a student under the bishop, Richard Channing Moore. Moore had begun life as a doctor of medicine and acquired a fair practice, when he suddenly abandoned this for theology—apparently a wise change, since he eventually became a celebrated Episcopal Bishop of Virginia. In 1799, he was entirely ready to augment a meager salary with the tuition fees of Robert and James: "Six months, with coach-hire for them, etc, £52 18s 5d."

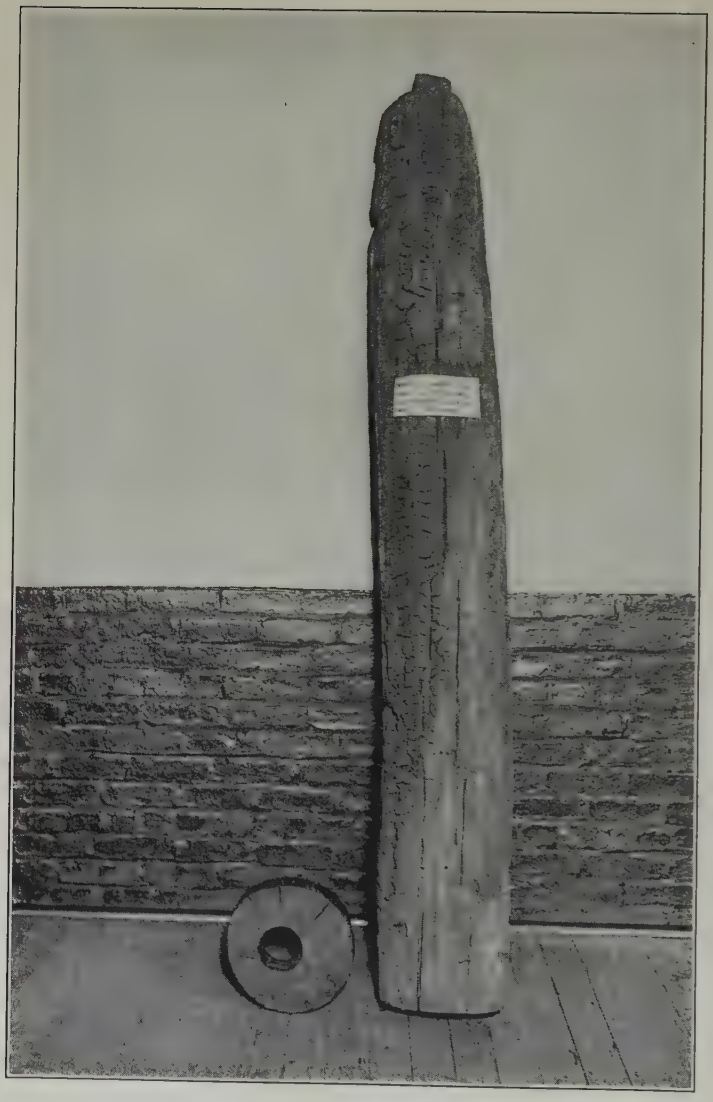
The colonel and Moore pressed the boys on to good records. Before long, however, a small building was erected on the Hoboken lawn and in it a scholar named Bogle took up the preparation of the Stevens boys for college. Four brothers went to King's in due course, but Robert, whose mental curiosity was the greatest, obtained his father's permission to continue under Bogle and become an engineer. Study was no trial to him and much of his playtime was spent in gazing through the window of a second out-house, in which some experiment of the colonel's was apt to be in progress. Edwin might be beside Robert on such occasions but John Cox usually preferred the tiller of a sailboat. James, as a boy, used boats mainly as a way to go fishing. In this favorite sport, he practiced to such purpose

that in late life he could entertain his friends by sitting in a chair, silk hat upon his head, and casting flies neatly into teacups placed at incredible distances from his feet. Only to Robert did *boat,* from the outset, inevitably mean *steamboat.*

Constantly on the river with the father, the boys often heard him inveigh against the prospect on the east bank. As their boat drew near the New York landing-stairs, the colonel damned the dingy city that Henry Adams would long afterward describe as "like a foreign seaport; unpaved, undrained, and as foul as a town surrounded by the tide could be." With its fevers and its prevalent plagues, how could men and women endure living in such a hole? As much for colorful protest as for good advertising, the colonel resolved to mark the birth of a new century by expanding and enriching his Hoboken gardens.

To any one interested in flowers he gave a warm welcome. From Richardson Brothers, booksellers, of Cornhill, London, he ordered each book on horticulture as soon as it left the press, while every local sale of seeds or bulbs found him elbowing his way to the front rank of buyers, in case some new variety might be offered. When he learned that a plaster "to promote the growth of trees and heal their wounds" had been compounded by Forsyth, a gardener to King George for whom the well-known shrub is named, the colonel's trial order went back to England by the ship that had brought the news. Every experimental fertilizer had its carefully tended plot at Hoboken; each plant and tree upon the hillside was given its best chance.

With Michael Floy, leading commercial florist of the day, and with Robert Renwick, the colonel entered into a definite horticultural partnership. By agreement a complete inventory of all plants, shrubs, and trees in the Stevens gardens was made, including the contents of those conspicuous



A LENGTH OF NEW YORK'S FIRST WATER MAIN

novelties called greenhouses. In addition to the estimated value of this inventory, the colonel's share in the enterprise covered ten acres set aside for the firm, the use of the buildings already erected and of any new ones found necessary, and the required supply of fuel for heating. All the fruit produced within a certain hedge of poplars was to be divided; one half to the colonel and one fourth to each of his partners, with the understanding that all grass and hay was to be his alone. Floy and Renwick, the former as treasurer, were to devote all their time to the business, but they do not appear to have done so. Originally made for ten years, the agreement soon languished and the inventory disappeared. Since, except for Dr. David Hosack's effort in New York, the Stevens gardens were the most elaborate and the most scientifically cultivated of the day, it is unfortunate that the record is not more complete. Those gardens —and the breezes that blew across them—undoubtedly played a leading part in making the heights of Weehawken New Jersey's richest modern field for wild flowers. Their history should be more than a patchwork of such odd scraps as the back of a note inviting the Stevens ladies "to drink tea with the Misses McCall on Saturday next"—used by the colonel for the rough draft of his letter to Gordon & Darmer, in London:

I have been very unfortunate, both in the seeds and plants which you shipped for me last spring. Instead of being near the top, they were put into the bottom of the vessel; the consequence of which was, they were so much confined and heated as to occasion the impairage of the greater part of them. But, in addition to this misfortune, the contents of the box in which the flowers and tender plants were packed were entirely destroyed by rats. Had they, however, escaped being heated and eaten by rats, they were certainly shipped a month too late.

Instead of arriving here in April, I did not receive them until near the latter part of May.

No wonder the colonel changed his British agents. In America, with William Hamilton, Dr. Hosack, and a score of others, he was constantly exchanging fuchsia for hydrangea, banksia for magnolia, and so on. To the superintendent of the botanical gardens of Jamaica he wrote, asking for slips and bulbs from "exotics," to which he carefully gave their botanical names. Particularly it was with Chancellor Livingston that he carried on a lively trading of this kind, as suggested by one of Livingston's letters:

I send, by this stage, poplar of the species I mentioned, a single oleander in seed, a Yucca gloriosa, a double-flowering pomegranate, a small plant of Bladder Senna—red, as I believe, but the seed being all off I may mistake it—the American Bladder Senna, and the Clermont or single white rose. You can send me, by the return of stage, anything you have of which you have reason to expect I have none.

Here the colonel paused, to make a marginal note of what he would send: "Fuchsia, Rosa Simplex Florans, Oxalis, Double Althia, Cornilla Emrus." Then he read the rest of the letter.

I have anxiously expected to hear of the boat, from which I have learned nothing; by which I fear she has not succeeded.

Your Mother proposes to spend the winter with us, tho' I believe is not absolutely determined thereon. What effect will Bonaparte's failure have? Will it procure us peace or shall we have war at all events?

A week later, Livingston was still mixing horticulture, personal items, and engineering.

I rec'd in good order the rich present of plants that you have made me, and wish it was in my power to return anything

further from here. I do not know anything but the double sunflower, the seeds of which I send herewith.

In all our former calculations, we have forgot that one-half the power is necessarily lost by water not acting as a solid body, and that so much force as is lost in making it recede *is* lost. By this time, I hope that your boat is finished; I hope by experiment that it will answer as well as you expected. Your mother, who had not fortitude enough to be frozen in here, will tell you all the news of your friends.

The colonel could never find time enough for his gardens because so many other activities clamored for his attention. At this particular moment, when New York's recurrent plagues were ascribed to foul water, the whole question of a proper supply came very much to the front. The shrewd Aaron Burr was the first to see how a screen of pure water could be used to hide a rival to Alexander Hamilton's banks; behind such a screen the Manhattan Company was born. Public service being the company's ostensible, highly laudable object, the necessity for what we should call a consulting engineer was apparent. Livingston, then inclined to Burr and very active in lobbying the legislature for a charter, suggested the selection of Colonel Stevens, who accordingly subscribed for a thousand shares at two dollars and a half and became a member of the company's original Board of Directors. At the first meeting he was appointed the head of a committee including Samuel Osgood and John B. Coles, with instructions to report immediately upon the best way to give the city fresh water. Very soon the company was buying hundreds of pine logs and boring them to build mains, while lead pipes were prepared as leads to carry the water actually into the houses. The published proposal stated that "each house shall be supplied with water in every quantity desired," with an estimate that "on paying

20 cents each month, each subscriber shall be supplied with at least one Hogshead of water during every 24 hours, and so in proportion for greater quantities." Later, the basis of payment became the number of fireplaces, a house with four of these being charged five dollars a year. To lay the hollow logs, with their clumsy gate-valves, and to connect them with the company's wells near the Collect Pond, became the colonel's job. The water was delivered to the surface "through plugs at convenient distances," while a fountain at the foot of Dey Street was used to supply the shipping at the wharves. Eventually, supplying two thousand houses through twenty-five miles of mains, the system ran all the way up to Bleecker Street; remains of it, in unexpectedly good condition, are still occasionally dug up by downtown excavators. To the colonel, Burr's underlying purpose was unimportant, although it was plain enough from a letter written to him by the chancellor:

Clermont, April 6th, 1799

You have seen the charter of the water works company of which you are a director and I hope will accept, at least until the thing is in motion. Never was a more liberal charter granted; as you find, it is perpetual and they are not limited in the application of the money. You should now endeavour to get the cheapest projects on foot, that more money may be spared for other purposes. I left you some observations on the health of the town, which it would facilitate your plans to publish and put out of the people's heads the idle idea of watering the streets.

In June the chancellor added:

I hear not what your company is doing as to a supply of water, but I hear it generally reported that you mean to do nothing but that job. I hope that this suggestion is not well founded.

The country looks charmingly and our prospects of plenty are very pleasing. And I hope, in spite of our government, that our prospects of peace are not less so. I write surrounded by five Gent'n, whose *jeux d'esprit* are constantly calling my attention; be not, therefore, surprised at the incoherence of this, but present me affectionately at home.

Although the colonel became a depositor, he had little or nothing to do with the founding of the bank. His time was spent in laying new pipes or in demonstrating that watering the streets was no "idle idea" but a vital factor in public health. Upon this point there was quite a spirited discussion, the colonel maintaining that salt water would not promote but retard the putrefaction of the refuse with which most of the streets were filled. Also under consideration was the question of the best power to use for distribution, the colonel believing that the horse-pumps, costing "at least five thousand dollars for 250 to 300 thousand gallons per diem," could profitably be replaced by steam-pumps. Livingston then suggested that the Manhattan buy one of the experimental engines previously built by Roosevelt, Stevens, and himself, contending that it was "astonishing how they [the company] obstinately refuse what is known to answer, and run after new ideas," to say nothing of "the negligence and fraud in the contractors or their servants, through which the [horse] pumps perform one-half they contract to do." Should Roosevelt be unwilling to part with the engine, the chancellor suggested importing one from England, only to discover that the colonel had plans for a steam-pump of his own.

Savery's pump appeared to him to be the best of the English designs. This introduced steam into a water-filled cylinder, expelled the water into a delivery pipe, and then, by clearing the cylinder of steam, created a vacuum to draw

more water from the well. But steam in direct contact with water—using, in effect, a water-piston—meant enormous condensation losses and prohibitive fuel-cost. To the colonel the importance of reducing these to reasonable limits was evident.

"My improvement," he wrote, "consists in placing the valves"—by which he meant the suction and discharge valves in the water-chamber—"at the bottom of a shaft [cylinder] of about 25 feet long." To cut off communication between the steam at the top and the water at the bottom of this "shaft," he placed "a column of oil 10, 15, or 20 feet high on the top of the water"; proposing, by mixing mineral and vegetable oils of differing specific gravities, to make this "separation between water and steam" complete. On top of the oil floated a cylindrical bag, made of canvas, and hooped to prevent its collapse; above this the top of the shaft was closed by a cone of wood through which was passed the steam-pipe from the boiler. Under steam-pressure the bag descended the shaft, forcing the water under the oil out through the discharge-valve and at the same time closing the suction-valve. After each "stroke" the steam was released from the cone through an exhaust-pipe, while the oil and water rose again in the shaft. As shown by his sketch, the colonel built the pump in two stages, discharging from the first into a second shaft and thus obtaining sufficient lift. In order to make the cones as little conducting as possible, he had "the hoops of wood covered inside with oil-cloth, having an interlining, between the hoops and the oil-cloth, of flannel or soft blanket." Further to save steam, he exhausted both cones into condensers placed in the two shafts or water-chambers. The pump was installed on the premises of the Manhattan Company, and, though we should

to-day hardly call it efficient, it did prove mechanically possible.

Learning that Appollos Kinsley, owner of a small machine-shop in Greenwich Street, had an idea but no money, the colonel next advanced some capital in exchange for a share in the patent-rights. Kinsley's letter indicates that what he had in hand was not only a pumping-engine for the Manhattan but also a device for operating power-tools.

Aug. 16th, 1801

We put our steam engine in operation yesterday; it revolves 47 times in a minute by a second-hand watch. It will lift eight pounds by a cord on a seven-inch wheel—which is equal to raising a gallon of water 70 feet high, per minute, or 1440 gal. 70 feet in 24 hours. . . .

It went with sufficient force to turn the wheel handsomely with a gouge & chisel, which is on the axis & [the axis] is six inches diameter. It several times lifted a 56 [pound] weight by a cord on the axis, but it was a little too heavy for it.

The quantity of fuel used after the furnace was hot was very trifling indeed. It appears as if it might run a century without a repair that would cost a shilling. One of twice that size would be worth four or five hundred dollars a year, to carry a turning-lathe. I intend to fix a small pump to it &, after we have played with it a while, that & the engine are at your service. Will you please to call tomorrow with Dr Brown [a Manhattan director] and see it operate.

Upon this, the colonel made numerous proposals to the Manhattan Company, most of them addressed to its president, Daniel Ludlow, an old friend for whom the colonel sometimes broke an established rule in order to bet ten guineas on their respective bushels of corn to the acre. In June, 1801, the colonel pledged himself "to have, in three

months from this day, a steam Engine complete, capable of delivering, at the height of the present reservoir, two million gallons of water per diem." The cost of this was to be fifteen thousand dollars, "with annual maintainance at ten thousand." Of this there is a record in the directors' minutes, September 4.

A letter from John Stevens, Esquire, was read, requesting that he be permitted to occupy a space of about twelve feet square for the purpose of erecting a steam-engine, within the building containing the horse-pumps, not in any way interfering with the same. Whereupon, RESOLVED

That Mr John Stevens be permitted to occupy the ground therein mentioned, for the purpose of erecting a Steam-Engine. It is understood, however, that the Company do not hereby engage to make a purchase thereof, but are at liberty to order the same removed, whenever they think proper.

Two boilers were then built by the colonel and arrangements were made for laying twelve-inch pipes "in a range" to the water wells. But as "Doc. Kinsley" fell ill and was unable to complete the engine, another one, constructed by Robert McQueen on the Boulton & Watt model, was substituted. This appears to have been in operation for many years, the Manhattan supplying the city with water until, in 1844, this service was taken over by the municipality.

Experimenting with pumps did not wholly distract the colonel from his main object—an engine to provide better means for crossing the Hudson. Still largely dependent upon a squadron of "pittyaugers," the colonel was determined to replace these with steam-driven boats, both to increase his own convenience and to provide a decent public service. Believing that steam, through its great saving of time, would in the long run be cheaper, he could see, by studying the existing ferry rates, just what the competition would be:

Bergen Court House, June 11, 1799, the Board of Chosen Freeholders met, pursuant to Adjournment. . . . Isaac Nicoll, Director.

From the fifteenth day of July next, the following rates to be taken at the different ferries on Hudson's River:

For every single person	0.06
Man and horse	.20
Horse, Cow, or ox	.18
Cow and calf	.22
Sheep or hogs, per head	.04
Horse, chair, and single person	.37
Horses, top chair, and single person	.42
Coach and two horses	1.25
Phaeton " " "	.90
Sleigh " " "	.75
" " one "	.62
Iron, per cwt	.02
Pipe or hogshead of beer	.75
Barrel of Beer or Cider	.12
Barrel of flour	.06
Bag " "	.03
Goods, wares, or merchandise up to 150 pds.	.06

All persons, carriages, cattle, etc., which pass between sunset and nine o'clock in the evening, to be double ferriage.

An idea of the design of steamboat then in hand may be gathered from the colonel's letter to Roosevelt in midsummer:

I would wish to determine on our plan for placing the paddles in the stern of the boat, and proceed immediately to putting it into execution. You and Stoudenger and Smallman must lay your heads together on the subject and, as soon as you have fixed upon the plan you conceive will be most eligible, I wish you would take a ride down here and communicate it to me. At the same time, I will give you the result of my cogitations. I think it will be necessary to have *two or three* rows of paddles in the stern.

In reply, Roosevelt was apologetic:

I wish it was in my power to expedite the boat faster than I do, as I am not only anxious to see the experiment made but ready to give you all the assistance in my power. Pray come up and see how things go on here, that I may be clear of all blame. Be so obliging as to send the paddles to the ferry house (York side) that I may get them up and begin fixing them so as to have all ready by the time the vessel is. . . . My pride will not suffer me to say anything on the subject of the cylinders, which is, at present, the only difficulty to be encountered.

Yet this was a most serious difficulty, because, power-driven borers being unknown, the turning of cylinders and pistons required great hook-tools, manned by several hands. A very similar job of boring a thirty-eight-inch cylinder for the Philadelphia water works required nearly four months, during which two men "practically lived in the cylinder, relieving each other night and day." Hence the Stevens-Roosevelt design used up plenty of time, in which the chancellor, still a partner in the business, could write the colonel:

I had been impatiently expecting a letter when I received yours. . . . The experiment seems to have been made under many disadvantages. The point of the utmost importance to ascertain is the actual velocity of the boat with a given power. . . . I should conclude that your paddles have about the same effect as my wheels. . . . If it should clearly be ascertained that the present engine will carry her 3½ miles an hour, then I should by all means agree with you in proceeding in the business on our joint account with Mr Roosevelt.

Progress with the small boat and paddles convinced the colonel that a larger craft should immediately be built—a suggestion of his which brought another letter from Livingston:

Clermont, Aug. 2nd

I am happy to find you so well satisfied from your last experiment of the practicability of your plan as to determine to proceed on a larger scale. It is much to be regretted that we could not have begun, during the long days and mild weather of summer, to set the boat in motion. No means should be neglected to do it as early as possible, not only on account of the profit but the great probable success of the scheme, before the boisterous weather starts.

I see many advantages in your new mode of placing the paddles, and but one difficulty—that of steering; unless you fix the rudder in the bow, which would perhaps be the best mode. The placing the condenser under water would, I believe, occasion some interruption in the motion of the boat; nor do I believe that the condensation can be in any way so rapid as by jet. To produce this, I think, the raising water into the condenser was quite unnecessary, since the jet might be made by a syringe or forcing-pump, acting on the water below the boat, which would be cooler than that raised into the well. And some weight and room in the boat might be saved thereby.

Both the colonel and the chancellor were attracted by the idea of using mercury in the steam cylinder, and about this the latter consulted the famous Dr. Priestley, discoverer of oxygen. When Priestley replied that "mercury may be used as proposed, without any great inconvenience," the chancellor sent this on to the colonel with the comment: "The more I reflect on this, the more I am satisfied that, *with your improvement of the double-ejection air-pump,* this [mercury] removes every possible defect of the steam-engine!"

Such enthusiasm was characteristic of the chancellor. In despair over one move of the colonel's, the next would so please him that he would prepare for a long leap forward into a rosy future. He was never aware that he was not as soundly practical as either of his two associates; never able

to realize that he could do most for American steamboating by making fewer suggestions himself and throwing his full influence and whole purse to the support of their ideas. Thus, on Christmas day, after considering a fresh plan of the colonel's, he wrote:

> 1st., the alteration you propose will enhance the expense; the whole frame for the support of the works must be altered or re-formed. 2nd, the casting and boring will be more difficult. 3rd, the boiler, being now barely sufficient for a 16-inch cylinder, will not suffice upon your plan because the steam, being exposed in the two cylinders to a greater surface than while confined in one, more of it will be lost; and also because the steam, being divided, double the time is afforded for the cylinder to cool.

Evidently the chancellor was not, at the outset, taken with the colonel's theory that the engine should be compounded. After some further reflection, his next letter was on feed-water heaters as proposed by the colonel:

> Your improvement, as I understand it, consists in putting the cylinders in the boiler so as to keep them always at the heat of boiling water. This, I think, it will perhaps more effectually do than the mode I proposed. . . . If the Manhattan will undertake it, as I think they certainly should, I should prefer your mode because it will save a considerable portion of steam. But in what way do you propose to get rid of your air and exhaust steam? I suppose you mean to annex air-pumps?

However, the chancellor did gain time for further experiments by obtaining from the New York legislature that extension of the Hudson grant which came to be known as the Fourth Law. In a pamphlet published during one of the many steamboat quarrels of the early eighteen hundreds this law was described as "a confirmation of the 3rd, passed

to Nicholas Roosevelt, John Stevens, and Robert R. Livingston . . . three gentlemen, two of whom are Jerseymen and the third married to a lady from that state and with a large property there." It was after this legislative success that the three bound themselves in writing to share, for twenty years after 1800, any steamboat enterprise which either of them might inaugurate upon the Hudson.

Livingston was not very sanguine with the colonel over the third partner. "As to Roosevelt," he wrote early in the year, "I believe we can expect nothing from him, for he is pursuing new schemes." And this was at least partly true, because Roosevelt had contracted to build several steam-pumps for the Philadelphia Water Company and had also undertaken to cast guns for the frigates of the *Constitution* class. Still, he had not altogether abandoned steamboat interest, for in August, 1800, he wrote the colonel from Laurel Hill:

> I am putting in new braces as well as new paddles—the whole will be done by the last of this week; if I can get finished before, I will inform you. I shall remain at home on Saturday in hopes of seeing you. I suppose your authority suffices, without the Chancellor's, as I consider you and him as one in this business.

During all these months, discussion of steamboats had been growing, although this, to be sure, was more evident in England than in America, where many citizens understood so little of Boulton & Watt that they thought the steam-engine itself ridiculous. The father of John and Benjamin Latrobe, both of whom afterward became prominently connected with the Baltimore & Ohio Railroad, was a typical skeptic who particularly irritated Colonel Stevens.

"There are," said he in what became known as "Latrobe's

Objections," "indeed general objections to the use of the Steam Engine for impelling boats, from which no particular mode of application can be free." These he proceeded to enumerate as follows:

> The weight of the engine and fuel.
> The large space occupied.
> The tendency of its action to rock the vessel and render it leaky.
> The expense of maintenance.
> The irregularity of its motion, and the motion of the water in the boiler & cistern, and of the fuel, with the vessel in rough water.
> The difficulty arising from the liability of the paddles or oars to break, if light; and from the weight, if made too strong.

Latrobe, by adding that "a sort of mania began to prevail for impelling boats by steam engines," branded the early American inventor with the adjective "crackbrained" that has ever since stuck to the profession. Believers were few, scoffers many, and the latter never hesitated to take a fling at the former. "The substitution," declared an Englishman named Brewster, "of the power of steam or heated air in place of the strength of men, appears to us no invention at all [!]; if it were, we should have numerous rivals contending for the honour of applying the Steam Engine to the threshing-machine. When Mr. Jonathan Hulls, therefore, in the year 1736, took out a patent for the application of one of Newcomen's Engines to a vessel for towing ships in and out of harbour, he merely proposed to substitute the power of steam in place of the power of men. His proposal was neither characterized by sagacity nor inventive genius; and the intermediate mechanisms by which the reciprocating motion of the piston was converted into the rotatory motion

of the paddle-wheels or fans, as he called them, was clumsy and imperfect."

Robert Stuart's comment upon the caustic Brewster expresses a rather better spirit toward the early pioneers of Colonel Stevens's day. "It is not always fair," he declared, "to judge of the value of a contrivance by its importance as estimated in times of comparatively refined invention. At this moment [1824] we should call the application of the Steam Engine to move Balloons a very fine invention, although the engine itself should be the identical one that had moved a threshing machine or a coal wagon!" In this spirit, it is perfectly proper to credit to-day's flights over the Pole or across the Atlantic to those determined experimenters who insisted that a steam-engine could and would drive a vessel.

In this same connection it seems only fair to give Nicholas Roosevelt his due. If he did not actually invent side-wheels, he was certainly one of the most insistent among their early advocates. We have already seen that he wanted to use them, in 1798, for the *Polacca*, as the small craft at Second River was called, and there is good evidence that he stuck to them ever afterward. One of the Latrobe sons, in his "Lost Chapter in the History of Steam Navigation," summarizes Roosevelt's views; it would be an insult to the intelligence of Robert Fulton to suppose that he did not study these views when the plans of the *Polacca* came to him in Paris, just as he studied the views of Cartwright, Watt, and others. Giving full credit to Roosevelt for paddle-wheels, there is one passage in Latrobe's brochure which is also significant with regard to Colonel Stevens. "That both Stevens and Fulton were wrong," said he, "and that Roosevelt was right, time has conclusively established." Since the "time" at which he wrote was one that called the side-wheeler a commonplace

and the propeller still a novelty, Latrobe naturally missed what is now obvious. The colonel's "wheels in the stern" were the real prophecy.

Notwithstanding his great hopes of succeeding with an American engine and the obvious difficulties in the way of importing an English one, the colonel thought it prudent to investigate the cost of a Boulton & Watt. The British engineers listed a four-horsepower engine, exclusive of setting-up, at £130; an eight-horsepower type at £500; the smaller of the two being designed to burn ten or twelve bushels of Liverpool coal in ten hours. An engine capable of raising 1500 tons of water thirty feet in twelve hours would be delivered at any port in England for £480; one that did the same work in six hours would cost £670 not including pumps. Of these two, the first was expected to burn "half a ship's bucket" (50 pounds); the second, a whole bucket. Since delivery at a British port was one thing, and getting them out of England quite another, the colonel concluded he would continue with his own efforts at home.

He was scrupulous in informing Livingston of every new idea, in order not to violate what was really the most important clause of the three-side agreement:

> It is further agreed that all improvements that may be made by either of the parties, in the mode of navigating a boat by steam, shall be for the mutual benefit of the parties in proportion to the respective shares they may hold. This agreement to continue in force for the term of twenty years unless sooner dissolved by mutual consent, either party reserving the right to sell or dispose of his share, first offering the pre-emption to the others.

Under this clause it was next proposed that Roosevelt should build a new engine, each of the three paying one third the

THE VILLA STEVENS 1787-1851

estimated cost of twelve hundred dollars and Roosevelt forfeiting one dollar for each day's delay beyond the first of the next May. These were the details:

First, a new cylinder is to be added to the Engine in the stead and place of the one now used, which new Cylinder is to be sixteen inches diameter, to work double; to make the usual threefoot strokes, and to be cased in the usual manner. The Boiler is to be so altered, agreeably to a plan proposed by . . . Robert Livingston, as to admit the hot water for replenishing the Boiler without the necessity of suspending a hot-well above the Boiler. The necessary cranks and paddles, upon a plan of John Stevens, are to be made; the frame work to be fixed; and the Machinery to be put in such a state as to be enabled to perform as far as the same may depend upon the skill of the operation. Two-thirds of the sum stipulated, being Eight hundred dollars, to be paid to Nicholas Roosevelt in equal weekly instalments.

When May came and the boat was not finished, the chancellor became caustic. "Is the whole scheme given over," he asked the colonel, "or has it miscarried? Or has the attraction of cohesion that usually subsists between you and Hoboken operated too strongly to permit those excursions to Second River which alone can overcome Roosevelt's delays? I think you should bring R. to some conclusion. If he will do nothing for us, it is not right that he should share in our inventions." As always, the chancellor could not appreciate the difficulties in the way of mechanically applying a theory; the distance that often lay between conception and realization was not appreciated by him. Upon these points the colonel remained the go-between; it was to him that Roosevelt replied when Livingston's complaint had been duly passed along:

The boat has constantly engaged my attention since you were here. I have had one set of hands employed the whole time

in boring, one set a-chizzling; one smith's fire, and three hands on the vessel. Every part of the work is now finished except the cylinder (which will require 10 nights' work, the only time I can devote to it) and the paddles, which might have been, long since, if the other work had been so forward as to require it. In two weeks, I now expect to be moving—how fast, I will not venture to say, but much faster than we have yet gone.

I will be silent about the execution of the work and leave you to judge of its merit and of how much I will lose by the job after receiving $1200. The Cylinder, it is true, has been the most tedious part of it, but, when finished, will add considerable volume to our engine. I am sorry we have all of us been disappointed in the time, but as I am the greatest sufferer I have the most reason to complain. I will wait on you some time next week. . . .

John Stevens, Esq
(To be left at Glendening's
Smith-shop, Fork of the road
to Powl's Hook and Hoboken)

Finished and given several trials, this boat proved not wholly satisfactory in that the vibration was very great. "Scrap her," said the colonel, "and build another." Livingston's view was that the "engine had been so fixed that the air could not pass under the bottom of it and therefore the bottom of the boat has been strained by the pressure of the atmosphere." He then suggested that this engine be sold to the Manhattan Company and that the old principle of Barker's wheel be adopted "as the simplest and best that can be applied to the propelling of a boat." Neither Roosevelt nor the colonel agreeing with this, the arguments that followed indicated that the partnership had one or two corners too many. The colonel, disappointed in the boat, and just then in very bad health, was further depressed by the loss of his mother, Elizabeth Alexander Stevens; the chancellor could find nothing cheerful to say except that he was pleased

with the "success of the Presidential election." Not until after the new year did the colonel get this more hopeful line from Clermont:

I have written to Col. Burr on the subject of taking our engine, as also to Doc. Brown & Mr Coles. I wish you would push this business, as it is a heavy and dead expense that keeps us from prosecuting our first idea, which I am sure we may accomplish and which I am now ashamed to relinquish. We join in our congratulations to you and Mrs Stevens on your entry into another century and wish, if you can amuse yourselves agreeably for the time, you may live happily to the end of it!

Reason for Livingston's better spirit is to be found in his having just been appointed minister to France. His leaving the country was a blow to American engineering progress, for his money, his enthusiasm, and his influence were all much missed by those who went on building engines without him. His own active interest in steamboating does not appear to have been rearoused until he met Fulton in Paris, for his early letters to the colonel were upon other matters—first impressions, for example:

Paris, January 25th

Accept from me a very hasty letter, written when I am fatigued with finishing my public one for this conveyance.

You have heard of our passage, of its risks and dangers, and of our safe arrival at a moment which proved destructive to so many others in these seas. Our women behaved with fortitude on the most trying occasion and landed in good health at L'Orient.

This gave us an opportunity of seeing a great part of Brittany and some of the most beautiful country in the world, along the Loire; since I have seen their country, I am less surprised at its exertions. The cultivation is carried to the highest state of perfection and its population is prodigious.

In travelling, you are never out of sight of towns and villages—sometimes four or five are in sight at once; nor are these interior towns small. Their population often amounts to 20,000 and sometimes more than that.

The inhabitants have an appearance of ease, both in their looks and manners. They are not only well-clad themselves but, in the winter when I saw them, their cattle are so, too—all having linen about their loins and every cow being attended by a woman who sat spinning in the fields; sometimes alone, at other times in groups notwithstanding the inclemency of the season. The people of this country seem absolutely insensible to cold, which, though less severe than with us, is enough so to be felt. This constant living in the open air gives great health and brilliant complexions.

But I shall never finish if I tell you all that is new to us here. You will not, however, excuse me if I say nothing of the most interesting object here—the First Consul.

His face you may judge of by the busts you have seen; they are like him. He is of your height, but very thin; his eyes are grey but lively and sensible; his manner in the circle easy and graceful; and he never fails to say something polite to every man of rank. He is, however, very seldom seen except by his ministers, with whom he is constantly employed. He gives audiences and dinners once a month to foreign ministers, and he visits nowhere. He is absolute here in Europe, where he gives the law. His court, therefore, as you may suppose, is very brilliant, as all Potentates are courting him. He is at present at Lyons, where he is gone to rest and give law and constitution to the Cisalpine Republic.

The people seem satisfied here. There are not wanting, however, some discontents even in the Army, but they will amount to nothing that will affect the government during his life at least, nor will any change be made which approximates the government to democracy.

Wealth and power being in the hands of new people, a general corruption of manner is, of course, prevalent, and the business of a minister is said to have been frustrated by the foolishness of his wife.

As to ourselves, we are agreeably situated but not so much

so as to make us prefer this to our own country. We were relieved of our anxiety on account of your health by a letter we received from Edward Livingston, informing us of your recovery. Polly has been unwell and confined to her room for some time past by a severe cold. She is somewhat better and joins me in presenting our love to you, Mrs Stevens, and the children.

Adieu, my dear Sir. Let me hear from you very soon. Write only of home, or of your own affairs; of this country, I shall have enough. Adieu again.

yours affectionately,
R. R. Livingston.

At least one close observer was able to present the First Consul without a rotund figure and the inevitable hand thrust into the breast of his coat.

In other letters, the chancellor showed that his interest in science, if a little side-tracked, was by no means lost. He wrote the colonel of European sheep and their breeding; of European plants and flowers; and, at some length, of Le Bon's experiments in making illuminating-gas from charcoal heated in a double stove:

. . . The gas as given off is passed thro' water, then led thro' pipes. When it comes in contact with the air, it is inflamed and continues to burn as long as the wood affords inflammable gas. The forms given to this light are extremely beautiful. . . . It is not sufficiently purified from carbon to be agreeable in a closed room.

I had several conversations with Count Rumford on the subject. He thinks it can be of no economical use. 1st, he says, much of the heat of the stove is lost; 2nd, the light is unsteady and by no means so intense as that of a candle. Not as much light as six candles would give you, but enough to read by—as by three candles. . . . I trust you will immediately set your fertile mind to work on this subject, so that when I return I may have the use of your models.

It was naturally impossible for the colonel to resist the suggestion that he do some experimenting along this new line. He went over to No. 7 Broadway to do this—possibly because Rachel would not let him begin at home. Almost nothing being known about purification in those days, the story goes that he soon had downtown New York thundering at his door, threatening arrest unless this "public nuisance" were abated. It was among the earliest American experiments with illuminating-gas, but the colonel was regretfully obliged to abandon it.

CHAPTER EIGHT

John Stevens was the first president of the Bergen Turnpike Company, chartered November 30, 1802. The date was a milestone in the family's efforts to create Jersey transportation, but the colonel was a long time in reaching it. Years earlier he had circulated a broadside To Whom It May Concern:

Notice is hereby given that the Surveyors of the Precincts of Bergen, New Barbadoes, & Hackensack have been notified by the Subscribers to meet at the house of Peter Stuyvesant in the Town of Bergen on Tuesday the thirty-first day of March Instant for the Intent and purpose of laying a Road from the said Town of Bergen to Hoboken Ferry.

March 24, 1789

John Stevens, Jun.
Isaac Vanderbeck
Elijah Gardner
Rodman Fields
Job Smith
Job T. Smithe
Henry E. . . .

The other men who signed the notice were all landowners, with biblical names but without the appropriate gift of prophecy. As so often happened in those days, one man with a progressive idea had to go it alone. A few petitions for roads were presented, but time passed with no tangible accomplishment. Then the colonel employed Abraham Ogden, leader of the Jersey bar, as counsel before the various committees appointed by the legislature ostensibly to act upon

the petitions. Ogden made a good effort; one of his letters is typical of many discussing the situation:

New York, Jan'y 6, 1793

The Commissioners, for locating the Bridges on the Rivers Passaic & Hackensack, are to meet at New Ark, at the house of Doctor Gifford, on Wednesday next, in order to determine upon the sites for the Bridges. As one of the Advocates for the Location upon Passaic at or near the Town Dock, & upon Hackensack at Dow's Ferry, I have held up the advantages resulting to the Public from branching the Road to Hobuck. This Argument has had weight.

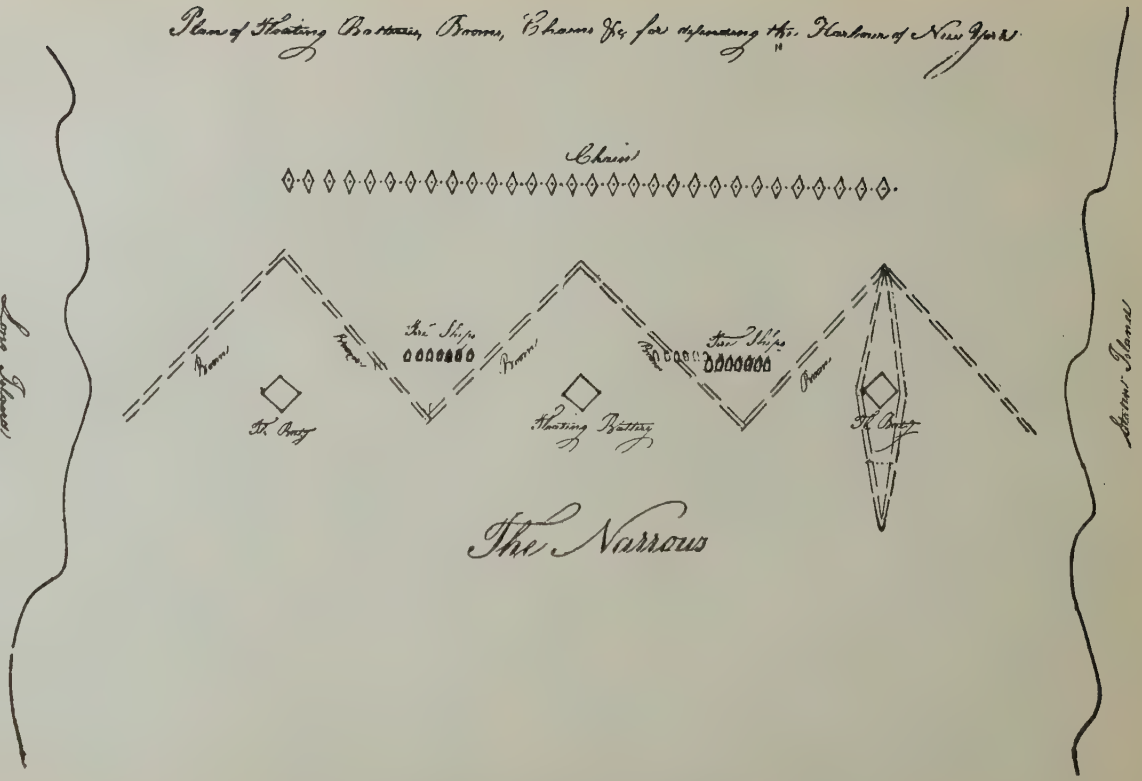
But it has been objected that the Causeway to Hobuck will cost more money than the Public will contribute to it. My answer was that you had offered to make it at your own expense. If you still adhere to that Resolution, as I am certain it is your interest to do, I beg you will be at New Ark Wednesday. Permit me to assure you that our joint exertions are necessary on this occasion.

Although he did adhere to his offer of the causeway, the colonel had very little satisfaction from this and similar meetings. Each man present having a different idea of the best course for the road, the first survey consumed months; when finished, it proposed an impossible feat of contemporary road-building—a line from Dow's ferry straight to the top of the Palisades. The modifying survey, made in 1794, aroused a howl of protest from those across whose lands the line ran. Ogden, lobbying the legislature for a fresh act, urged the colonel to "keep in the background," lest it be said that he alone would profit from any road to Hoboken. When the act passed, designating Messrs. Kemble, Neilson, Tuthill, and others as commissioners, the colonel disregarded Ogden's advice. He came forward with a renewal of his offer to build the causeway and a further offer to make himself surety to all property owners damaged by

the road. Fortunately for him, the commissioners "viewed the land through which the said road was layed out . . . across the fields of Marcelus Marselison, Peter Stuyvesant, Jacob Newkirk, and Cornelis Van Vorst" and agreed that, of all these, only Marselison, "to the amount of Fifteen Pounds New York Currency," would suffer any damage at all! But there were still many grumblers. An attempt to satisfy all concerned filled two years of controversy and left little room for any real progress.

Following his own idea for the course of the road, the colonel covered the whole line on horseback, in his carriage, or on foot. "You may," he told Ogden, "recollect passing a Gully down which a small stream of water was precipitated over huge masses of rock? That I should leave no place unexplored. . . . I ascended this Gully and, contrary to my expectations, found that it was not only practicable to make a road of it, but that . . . it was preferable to any other route. You will perceive that it is much the nearest to Hoboken." Since what had long been known as the "English Neighborhood Road" was distant only "45 Chains, crossing two lots of poor land," the colonel was convinced that his line was the best. He offered to pay for an official survey to prove it.

However, he added that his plan would "probably bring the whole town of Bergen down upon my back," and this is exactly what happened. Many mass meetings were held, at one of which the colonel declared that he had never been "insulted and abused in the manner of these People." To meet their views, he would have to run his causeway in a different place, at about double the estimated cost. This he eventually agreed to do, engaging John Seely for the causeway and also to build a bridge. The causeway was constructed of timbers sixteen feet long, over which cedar



A STEVENS PLAN FOR DEFENDING NEW YORK CITY

boughs were laid and covered with sand a foot thick, to raise the road some eighteen inches above the level of the salt meadow. The colonel paid Seely "two hundred pounds and also allowed him the pasturing of two cows," besides furnishing the necessary timbers. For building across the marsh a bank, twelve feet wide and five feet high, Seely got twenty shillings a rod, the colonel supplying "four carts and four yoak of oxen with keeping for the same."

The road, as built, was a poor compromise. It crossed the English Neighborhood Road at "Dan Kelly's Hotel," and, as the Hudson County History describes it, "a considerable portion was built through a thick and growing cedar swamp." Nobody was really satisfied, and even the survey of 1858 did not settle all the titles and other questions still in dispute. Indeed, the road varied so greatly from its original authorization that the Jersey legislature, as recently as 1922, found itself busy with supplementary clarifying acts. It is small wonder that the colonel, while the road was building, chafed under all the disagreements and delays.

Among other obstacles, after he had built his causeway, he had to overcome the unwillingness of the commissioners to open the Hackensack bridge unless the road more closely followed the survey, a matter for which the colonel held himself in no way to blame. "Surely, Gentlemen," he wrote them, "it is unnecessary for me to point out to you how much the public are interested in having the road opened as speedily as possible. Your sense of the duty you owe as Commissioners will stimulate you to every exertion." Apparently it was another Ogden—Samuel, himself one of the commission—who finally got the bridge open. In a letter on the subject he said: "If it is not done, I have no objection to becoming prosecutor, and will sue the road-overseer once

each week under the Road-Law. Push on your own road and everything else will follow."

Actually completed and opened at last, the road was described as "well and sufficiently drained by ditches and subterraneous passages, with a dry and solid foundation at all seasons of the year." To see that upkeep was not neglected, the latest act provided that "six judicious freeholders" should pass upon the road's condition at intervals. For their judiciousness, it may at least be said that the road is still there.

The Bergen Turnpike Company included, as additional incorporators, Lewis Moore, Robert Campbell, Nehemiah Wade, Garret Lansing, and Adam Boyd. It had a capital stock of seven thousand dollars per mile of road, with shares at twenty-five dollars each open to public subscription. When it had eventually been authorized to collect toll, the charges, covering almost every contingency, varied from "9 cents for each sleigh or sled" to "25 cents for each carriage drawn by two beasts." On wagon-wheels there was an "abatement of one-quarter for fellows and tyres that are flat and at least six inches wide," while one half was remitted if these felloes reached the width of twelve inches. It was most carefully stipulated that no toll was to be collected from "any person passing to or from public worship, or to or from any mill to which he may resort for the grinding of grain for his family use; or horses or carriages solely conveying persons to or from a funeral; or any person passing to or from his common business on his farm; or any militiaman passing to or from any training on a muster day." With these rather broad exceptions, all travelers must pay for the privilege of using the road, and they were numerous enough to warrant fixing the maximum dividend to stock-

holders at 15 per cent., with the surplus to go toward reducing the rates of toll.

For years the increasing rivalry between Hoboken and Paulus Hook broke out in quarrels over the roads. For example, in 1804 the "Associates of the Jersey Company," organized ostensibly for road-building and maintenance but similar to the Manhattan Company in its unavowed purpose of operating a bank, petitioned for authority to collect tolls from Paulus Hook all the way to the Hackensack. This brought the colonel immediately up in arms. "In a Business of this nature," he insisted, "the public convenience and advantage ought to be the primary object. . . . Should the application be approved . . . great injustice would be done to the Public as well as to the owner of the Ferry at Hoboken. . . . Travelers to Hoboken would be compelled to pay toll to Paulus Hook, a distance of nearly three miles. . . . They would travel on said turnpike no further than the intersection of the road to Hoboken . . . about half a mile. . . . If any favour was to be conferred on either ferry, I conceive Hoboken is clearly entitled to preference. . . . The road from Hoboken to the intersection with the Paulus Hook road was bought from the owners of the land at very heavy expense, and has been made and kept in repair at my own expense for years past." To his plea was added that of the "Inhabitants of the Counties of Bergen, Essex, and Morris," who saw nothing but graft in a requirement that they pay tolls on a road they never used. The attempt was blocked. Like other similar fights, it served to spur the colonel to greater efforts in designing boats and engines that should make the Hoboken ferry of such commercial importance as to turn all business its way.

In these early years of the nineteenth century a constant

correspondent was Dr. John Redmond Coxe of Philadelphia, with whom the colonel was connected through the doctor's marriage to Rachel Stevens' sister Sarah. When this wedding added the final vowel to the maiden name of Sarah Cox, she remarked: "From now on, I mean to take my E's!" The two families were always close friends, although Dr. Coxe was sometimes a little condescending in his amusement over the colonel's conjectures upon the causes of malaria and yellow fever, or upon the use of boneset tea as the sovereign remedy. At the same time, the doctor was deeply interested in the mechanical devices and experiments at Hoboken; without venturing his own views, he often published, in the magazine of which he was for some time editor, the colonel's articles upon such subjects. Hence it was natural that the colonel should write the doctor for information about Oliver Evans, another figure whose vision, like that of Fitch, was clouded with bad luck; whose efforts have been neither fully nor too kindly dealt with in American engineering history.

In the narrow news columns of "The Philadelphia Aurora," sandwiched between the advertisements of shipchandlers and those of house-brokers, some account of Evans's experiments had caught the searching eye of the colonel. "I think," he wrote to Coxe, "that Evans and I may have hit upon the same idea." Explaining how he was himself making use of M. Belamour's discovery that "the elasticity of steam is nearly doubled by every addition, to the temperature, of 30 deg. F.," the colonel urged Coxe to obtain details. The specific questions, to which have been added the answers as Coxe wrote them, were these:

With what weight is the safety-valve loaded? 30 pds. 56 expected.

With what material is the piston packed? With hemp.

Does the piston move in the cylinder in the usual manner? Yes. Six inch diameter.

Is the piston attached to a Balanced Beam? To the crank of a fly-wheel.

Is there any peculiarity in the construction of valves or in the working gear? Two cocks with gears are worked by the fly-wheel.

What is the length of stroke, and how many strokes per minute? Ten inches. 30 strokes per minute.

Repeating his hope that there need be no clash with Evans, the colonel declared that "unless Mr. Evans should claim all the credit," there would be none. However, to prepare for even that unfortunate chance, he asked Dr. Coxe to mark the exact hour when the letter reached him and to note particularly the boiler-sketch inclosed in it, with a word of explanation.

After a prompt call upon Evans, the doctor reported him most pleasant and communicative. His engine "appeared to be very powerful," though at the time of the visit it "was leaking badly, which he endeavoured to stop by throwing in meal." From this, and Coxe's specific answers, the colonel concluded there would be no interference between Evans and himself. However, he took the additional precaution of sending a full description of his own devices to Dr. Mitchell, then editing the "American Philosophical and Medical Journal of Philadelphia," with the request that Mitchell also make note of the exact hour of receipt.

Subsequent letters dealt with rumors of further improvements by Evans. Dr. Coxe reported "everything about as before," except that "Evans expects *to blow you all up* with an engine on the principle of a volcano!" This new design was attributed by Coxe chiefly to Valcourt, a French new-

comer, of whom there is but a disappointingly thin thread of record. Such efforts eventually made it as well for the colonel that he had taken his precautions as to "day and hour of receipt." Evans was not long in applying for patents, and it was only these exact data on the colonel's letters which convinced Evans that there had been no attempt at copying. Evans could secure protection for his actual machines, but could not, of course, patent the *principle*, nor bar any one else from using it. Some time later Evans wrote, proposing to build for the Stevens boat an engine which he declared he would "warrant to work four years without repairs."

> If [said he] the speed of the English engine [Watt and Boulton] be 6 miles per hour and the engine and boat cost $15,000—or $2,500 per mile—then another mile would be the most valuable of the 7, because speed is what counts. I assume that you will willingly pay me in that proportion for all the additional velocity I can give my engine—that is, $2,500 more for that extra mile. If I use more fuel—say, 1/8 more—then I will deduct 1/8 from the price. But if I use 1/8 less fuel, in proportion to the square of the respective velocities—then you pay me 1/8 more.

Evans, because he always "preferred that those who had spent so much time and labour to produce useful steamboats" should have the first opportunity to use his engine, declared that he was anxious to cultivate the colonel's friendship. Unable to resist his fling at "other inventors," he complained that these had sneered at his engine just as the millers had sneered at his improvements in the method of grinding flour. The millers had not dared to risk a trial until some one else, by doing so, had proved that Evans's method meant more profit; now they were "freely paying large sums for the

THE ELYSIAN FIELDS

An Active Waiter Was Wanted

License to employ what they refused as a gift, years before." According to his letter, Evans then had ten steam engines in use and ten more under construction. One, which he asked the colonel to inspect, was at Middletown, Connecticut, and could not, declared Evans, he surpassed for "simplicity, durability, & economy." It had twenty-four horsepower, but he was ready to build the colonel one that should be twice as powerful. However, the colonel at this time bought nothing; it was some years afterward that certain parts for Stevens engines were built at Evans's factory on the Delaware.

The colonel was more particularly interested in boilers, his next patent, of April 11, 1803, covering his improved multitubular type on the following specifications:

> Suppose a plate of brass of one foot square, perforated by a number of copper tubes of one inch diameter and two feet long, the other ends of which are to be inserted in like manner into a similar plate of brass. The tubes, to insure their tightness, to be cast in the plates. These plates are to be closed at each end of the pipes by a strong cap of cast iron or brass, so as to leave a space of an inch or two between the plates and their respective caps. Screw bolts pass thro' the caps into the plates. The necessary supply of water is to be injected by means of a forcing pump into the cap at one end, and, through the tube inserted into the cap at the other end, the Steam is to be conveyed to a cylinder of a steam engine.
>
> As the boiler now described embraces the most eligible mode that has yet occurred to me, of applying the principle, it is unnecessary to give descriptions of boilers less perfect in form and construction, especially as these forms may be diversified in a thousand different modes.
>
> John Stevens
>
> Signed in presence of us
> Jas. Keese
> Chas T. Keese

It was a correspondence in connection with this patent that brought about an intimacy with Dr. William Thornton, then superintendent of the Patent Office. Thornton after moving to Philadelphia from the West Indies, where he was born, had led a busy life. While practising medicine he had invented a system of lip-reading for the deaf; later, he had worked out a code of phonetic spelling. When general science had drawn him altogether away from medicine, he met John Fitch, to whom he gave both advice and money. When Fitch formed a stock company to push his engine, he was joined by Richard Stockton, Benjamin Say, Henry Voight, John Nicolson, and others; of them all, Thornton was the best informed. Steamboating attracted him as a branch of philosophy, just as the politics of the then Republican Party convinced him because Jefferson, a philosopher, was at the head of it. Incidentally, Thornton, like Jefferson again, was an early and ardent abolitionist, though he is doubtless better remembered for his work in the designing of the Capitol at Washington. In him the colonel found a good friend and, later, a stanch ally.

Books, rare flowers, and elaborate engineering experiments kept the colonel in chronic need of money. Moreover, Rachel had been anything but idle, since in the past seven years she had presented him with three daughters—Elizabeth Juliana, Mary, and Harriet—and was about to add a fourth, Esther Cox. The family was distinctly land-poor in 1804, and the colonel therefore proposed to lease fifty of the best lots at Hoboken, "fronting on the Turnpike Road to Hackensack which, to the extent of one mile from the ferry, will be opened to 100 feet wide," and having a sandy soil, "dry at all seasons and admirable for sickly persons." But his requirements for tenants remained so rigid that he actually executed only a very few leases, some of which,

however, serve to illustrate his ideas of property rights and the ethics of a landlord. Samuel Campbell's lease covered a house, a farm, and a ferry consisting of two pittyaugers and two ferryboats, with due right to use the ferry stairs at New York under proviso that the colonel might occasionally call upon him for free ferriage. Except for the actual heating of his house, Campbell was "not to cut wood from the lots back of Hoboken"; he was not to deny the colonel's right to pasture cows on the large field to the westward of the road and fence the field off if he so pleased. The arrangement appears to have satisfied Campbell, for, when an opportunity to sell aroused the colonel's interest, Campbell's ready consent brought a note of appreciation:

> Considering the disadvantages to you, and the two unexpected ferries intercepting your Custom; the repairs you have made, and the improvements, have added to the value of my property. I further recollect a considerable expense you were at, in the experiment of Ploughing and Ditching my Salt Meadow which, though unsuccessful, yet, if it had succeeded, would have added much more to the value of the Meadow. I consider your making the Milk-room impregnable to Rats a durable improvement, and many other Items have been very expensive. One thing more is the disappointment to you from Gen'l Cummings' not running his Stages to Hoboken, which I make no doubt was the principal Stimulus to your agreeing to such a *high rent*. I again refer to my disposing of the land and your giving up possession. Justice should be rendered to you.
>
> I put down the sum which I think you ought to pay for the last Six Years at 6000 Doll., with £350 for the coming year. If you have any objections, state them candidly, and let us have an amicable settlement, without the assistance of other men. For assuredly no one knows more about our affairs than we do ourselves.

Litigation, under any circumstances, was never the colonel's choice. As he saw the goddess whom lawyers call

Justice, she either wore her bandage very thin, or else adjusted it badly when she was hurried into court. In his opinion, man to man was always the cleanest and most honest method of settling a difference. Dozens of his letters, on every sort of question, prove it.

The scarcity of leases presently led him to offer eight hundred small lots at public sale. For an auction, he naturally selected the Tontine Coffee House; noon of April 9 was set, as the hour when gentlemen of leisure and fortune were up and about, while gentlemen of affairs were gathering to hear the day's news before their early dinners. At great length, the colonel offered his inducements:

> As many persons are desirous of obtaining situations, where they may transact business free from the danger of yellow fever, the restrictions of quarantine, the duty on auctions, and the heavy taxes on incorporated cities; the subscriber offers for sale the most advantageously situated part of his estate, laid out in the form of a town and subdivided into full lots for the convenience of purchasers. . . .
>
> The townplot will extend along the turnpike road about half a mile. . . . Streets of 80 feet wide will run parallel to the turnpike on each side. . . . Nearly in the center . . . a square, or oblong, at least 800 feet long, by 400 feet wide, will be reserved for public uses. . . .
>
> The water lots will, for the most part, have a margin of 80 or 100 feet above the bank of the river, and will extend into the river about 400 feet to the channel.

From the ferry stairs at Hoboken to De Cline's wharf near the New York State prison was—as the colonel took pains to point out—a mile, the shortest distance across the Hudson. Every day in the year—Sundays, of course, excepted—public stages reached and left the Jersey shore. The colonel promised to erect, during that summer, wharves that would be "more secure from high winds and ice than

those on the opposite side," while warehouses, "where ships of any burthen might deposit and dispose of their cargoes," would promptly be built. He declared that the "harbour of Hoboken is as easy of access as . . . New York, and more convenient for vessels navigating the Hudson." Vessels clearing from the Jersey side during the prevalence of yellow fever in New York would avoid the inconvenient expense of quarantine on arrival in foreign ports. To himself he would reserve the right of public ferriage, but the owners of water-lots were to be permitted to "keep boats for crossing themselves and their families to and from New York but not for other persons." Finally, easy payments were provided for, the colonel even promising to lend small sums to those who should "prove desirous of making spirited improvements."

Although it is to be hoped the colonel never contemplated such exterior designs as often cover the ideal homes of to-day, his general development plan is familiar enough in modern Jersey. Property-owners were to be allowed a restricted use of the walks, drives, and lawns upon the hillside —the Elysian Fields, as they came to be called—for a cool, quiet resort. To stir New York to greater appreciation, the colonel used his favorite newspaper, the "American Citizen." Its June issues, in the columns next to the announcements of Signor Manfredi's breath-taking, death-defying feats upon the tight-rope, offered more restful entertainment across the river:

> The public are respectfully informed that, at this peculiarly pleasant retreat, every attention to accommodate parties with refreshment in summer season may be met with.
>
> An active waiter is wanted; no one need apply, without good recommendations.
>
> At the above place are for sale a very handsome pair of Bay horses, equally fitted for the carriage and the Saddle;

they are well broken and in complete order. Horses and carriages to let.

On the colonel's petition, the legislature authorized the incorporation of "The President and Directors of the Hoboken Company" whenever certain conditions had been met: Fifty thousand dollars must be spent upon wharves, buildings, and improvements, with another half million subscribed "by citizens of the United States" for similar purposes and also "to erect a bank, an insurance company, and other useful departments." Twenty families must have become regular inhabitants before incorporation was to be permitted. As a preliminary, the colonel proceeded with the wharves, employing Captain John Anderson of Newburgh to build these and also to lay out more roads. Captain Anderson has left a trace of his struggle:

> Sir, I am pressed very hard for some cash to pay the men who are digging the road. I assure you I have not a farthing. I have paid all the cash I had last week. I have not, nor have I had this week, cash sufficient to enable me to get common necessaries for my Family.
>
> I am sorry to call on you but I wish to have some little assistance from the men who stand like vultures ready to devour
>
> your friend
>
> J. Anderson.

Could *Mr. Micawber* himself have said more? A note on this letter, in the colonel's hand, runs, "Sent Mr. Anderson $100"—by which it is to be hoped the vultures were at least temporarily appeased. Captain Anderson was a faithful and an able builder of roads and wharves; his work lasted until modern methods would have none of it. But other developments lagged, and the colonel chafed under vexatious delays. He wanted progress for its own sake and he needed the

"ready hard." His notes of hand, in varying amounts and for terms anywhere between several days and several years, became so thickly sprinkled among his friends that some of them were nearly snowed under. Ultimately to meet these obligations cost him sacrifices. Still, he grudged no sacrifice that might take him one step nearer the Hudson River—and a good ferry service across it.

With Livingston, in Paris, he was in constant correspondence, sometimes on purely scientific questions, often on personal matters. Dr. Coxe's brother Daniel, a Philadelphia loyalist during the Revolution who afterward moved to Europe, had become involved with the Paris police, and in his behalf the colonel appealed to the chancellor. The plea for Daniel Coxe's "enlargement," or at least "parole within limits," is of interest chiefly because of Livingston's reply. This brought to the colonel his first news of the man who would later stand so obstinately across his path:

Paris, April 28th, 1804

Though I am indebted to you a letter . . . this will hardly be considered by you as payment. . . .

I have, as requested, obtained the release of Mr Coxe. . . . He had a quarrel with one of the officers of the Police. He cannot be considered an American citizen, having left the country during the Revolution and never been naturalized. . . . You have no idea how much trouble I have . . . with claimants to American nationality, which is eagerly sought after on all hands. . . .

The principal object I have in view, is to introduce to your acquaintance Mr Fulton, with whom you will be much pleased. He is a man of science and embued with the best of principles. . . . He is the inventor of a diving boat which is extremely original. . . . He was my partner in an experiment made here on the Steam Boat, and his object is to build one in the United States by way of experiment. . . .

As you will see Mr Fulton, it is unnecessary to give you any

further details. . . . You never have mentioned the reception of a very fine collection of seeds I sent you from the botanic gardens. . . . I am not without hopes of seeing you before the month of September at Hoboken.

This makes it evident that Fulton expected to return to America at once; most probably, he was to have carried this letter and handed it to the colonel. It is unfortunate that the chancellor did not "give further details," since we should then have known how much actual share he claimed in the Seine experiments. As matters stood, it was not for another two years that Fulton was presented to the colonel, by which time the latter had taken strides that justified him in thinking himself well abreast of progress in steamboat engineering.

CHAPTER NINE

In May of 1804, three young students of King's College, New York, did what all their world, on a bright afternoon, was in the habit of doing: they went for a stroll in Battery Park. One of them has not been identified; another was John H. Hill, later a notable missionary to Greece; and the third was James Renwick, long to be distinguished as professor of natural and experimental philosophy at his own Columbia University, an authority on many subjects, and the author of several books. All three young men were interested in whatever the town might have to show them. It was Renwick, writing years later to Frederick De Puyster, who described the event of the day:

> As we entered the gate from Broadway, we saw what we, in those days, considered a crowd, running toward the river. On inquiring the cause, we were informed that "Jack" Stevens was going over to Hoboken in a queer sort of boat. On reaching the bulkhead by which the Battery was then bounded, we saw lying against it a vessel about the size of a Whitehall rowboat, in which there was a small engine *but no visible means of propulsion.* The vessel was speedily underway, my late much-valued friend, Commodore Stevens, acting as coxswain, and I presume the smutty-looking personage who fulfilled the duties of engineer, fireman, and crew, was his more practical brother, Robert L. Stevens.

Renwick was right. In that little craft the helmsman was John Cox, while the figure in dungarees was fastidious Robert. Every one present had seen the Stevens boys often

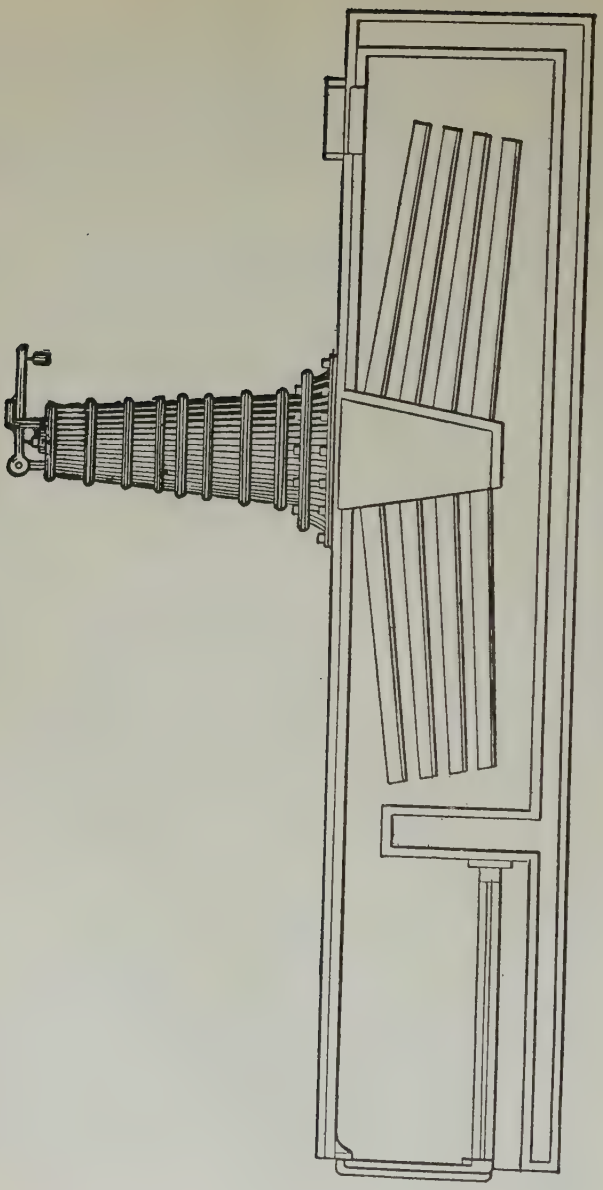
enough; a Stevens steamboat was no particular novelty; and the engine was quite obviously the latest Hoboken experiment. What baffled that Battery crowd was the very point Renwick had emphasized. *How* was the boat driven? Twenty-five or thirty years later many might have been able to answer that question; but the *Little Juliana*—so named in honor of the eldest Stevens daughter—would still have been regarded as a freak. By Civil War days she would have been merely unusual; in the middle of the seventies the world would be ready to accept her principal feature as the true standard of steamboating. When she got "speedily underway" on that afternoon of May, 1804, she embodied John Stevens's long-held theory of "wheels in the stern." In her he had made the first-known successful application of steam to the "invisible means of propulsion"—twin-screw propellers.

Standing on his lawn, watching the *Little Juliana* puff across the Hudson tide to the dock at his feet, the colonel did not claim to be the *inventor* of the propeller. A *development*, from years spent in studying its possibilities, was what he called it. The spiral of Archimedes was a bit of ancient history that had long interested him, and he knew the Chinese water-wheel, or scull, had been in existence for ages. During his own boyhood, Bernouli had stated the mathematical principle of the screw in 1763; twenty-five years later David Bushnell had described to Jefferson the use of a hand-propeller to drive his submarine boat. Again —although this the colonel did not know at the time— Fulton's submarine was, in this respect, similar to Bushnell's. From Paris, February 16, 1798, Fulton, in a letter to Cartwright, said he had "just proved an experiment on moving boats with a fly of four parts, similar to that of a smoke-jack," but not operated by steam. In another letter

to Cartwright (1802), Fulton, although he said "the smoke-jack flyers will not answer for a quick movement," went on to explain that "reduced to 2 arms, it answers admirably for my plunging-boat," and added the details of cranking by man-power in the experiment that led him to tell Fulner Skipworth that for steam-engines he had "found oars to be the best." Moreover, English patents had been issued to William Lyttelton in 1794 and to Edward Shorter in 1800, covering complicated systems of endless ropes and pulleys through which man-turned propellers were calculated to give vessels a speed of one and a half miles an hour.

The model of John Fitch's boat has a spiral in the stern. In his letters to the colonel, Fitch never mentioned this; but, although it is hardly what we understand by a propeller, he may have used it as an auxiliary to his oars. These cases, like that of Morey and the contemporary attempts of Patrick Miller and William Symington in England, all serve to show that men had for some years been groping about the idea—the principle of a windmill, reversed. If *invention*, properly speaking, be the mechanical application of an established principle, or the new and useful harnessing of a known force, then the twin-screw, whether he claimed it or not, stands to the colonel's credit. He was the first to give the propellers a shape resembling the present one, and the first to drive them successfully by steam.

Although "one thing at a time" was not one of his regular maxims, he had, in this case, applied it. In 1802 he began with a single screw, placed in the center of the stern. The engine with which he drove it was one he always described as a "rotatory," designed primarily "to overcome the mischievous effects necessarily arising from the alternating strokes of the engine on the ordinary construction." He has left a description of it.



THE JULIANA'S BOILER

For simplicity, lightness, and compactness, the engine far exceeded any I have yet seen. A cylinder of brass, about eight inches diameter and four inches long, was placed horizontally in the bottom of the boat; and, by the alternating pressure of the steam on two sliding wings, the axis passing thro' its center was made to revolve. On one end of this axis, which passed through the stern of the boat, wings like those on the arms of a windmill were fixed, adjusted to the most advantageous angle for operation on the water. This constituted the whole of the machinery.

Working with the elasticity of steam merely, no condenser, no air pump was necessary. And, as there were no valves, no apparatus was required for opening and closing them. This simple little steam engine was, in the summer of 1802, placed on board a flat-bottomed boat I had built for the purpose. She was occasionally kept going until the cold weather stopt us. When the engine was in the boat, her velocity was about four miles an hour.

It is a brief account of an event in navigation second only to the birth of the steam-engine itself. "Wings, like those on the arms of a windmill, *adjusted to the most advantageous angle*," would fit the propellers of any modern liner. Incidentally, when he rotated a shaft passing through a steam-drum, was not the colonel within hailing distance of a turbine ship?

Leakage through the primitive packing, and severe steam losses in the drum, influenced him to revert to the reciprocating engine. In doing this he kept constantly in mind the "necessity of guarding against the injurious effects of partial pressure"—by which he meant those disruptive strains to which his own and other early steamboats were subjected. "It is," he declared, "indispensably necessary that a steam engine . . . should be so arranged that the power shall be communicated to the water-wheels without causing any strains in any part of the boat. To effect this, the cylinder

must be firmly and immovably connected to the support of the axis of the cog-wheels on each side of the cylinder." Upon this theory, during the winter of 1802-3, he set up a new engine in a shop near the Manhattan Company's plant in Duane Street. The assembling was done by the mechanics of Robert McQueen, whose shop was close by if not actually under the same roof. Held down upon blocks, this engine had repeated test runs until, early next spring, it could be installed in the previous year's boat. "The reciprocating motion of the piston," wrote the colonel, "was transferred to the axis by bevel cogs," and the result "gave the boat somewhat more than the velocity of the rotatory engine."

In "Anecdotes of the Steam Engine" (London, 1829), Stuart says of the colonel's next step that "at last, he had recourse to a Bolton and Watt engine." This is not quite exact, for he had already built several on the principle of Watt, always modifying them by his own efforts to save space and weight. In this newest one he used, as Stuart says, "a cylinder of 4½ inches, with a 9 inch stroke." At the same time he ordered from McQueen, in preparation for larger operations, two sixteen-inch cylinders. These he proposed to bore in his own Hoboken shop—if so pretentious a term may be applied to that little building on the lower lawn which would some day be lost in the center of a well-equipped progressive plant. It had long served the colonel as a place of elaborate designs that sprang into his mind when he was inspecting his orchard or when he was taking wine in front of his library fire; as a workroom for making detailed drawings from the crumpled sketches that forever filled his coat-tail pockets; or as the scene of many discussions of suggestions from the indefatigable Robert, who scarcely missed a turn of the crude bar at work upon the cylinders. That work finished, it was at first proposed to use the cylin-

ders in a new ferry-boat, eighty feet long and twelve feet in beam; eventually they went into a different craft, that was herself to make a little Stevens history. This, however, was not until after they had been well tested in connection with a number of boiler experiments.

Boilers were a serious problem, in which lay the chief obstacle to using the screw-propeller. In the modern sense of the term boilermakers, such artisans simply did not exist at this stage of engineering. Materials, too, were of the crudest. Joints blew out a dozen times a day, developing fatal leaks at the very moment when a workable head of steam had been raised. "Begin again" was an order so often given in that little shop that it might well have been painted upon the wall, a forerunner of to-day's "Do It Now" school. After each disappointment the colonel persisted in his favorite design, the small tubes inserted into heads. How to maintain the pressure for propellers was a puzzle.

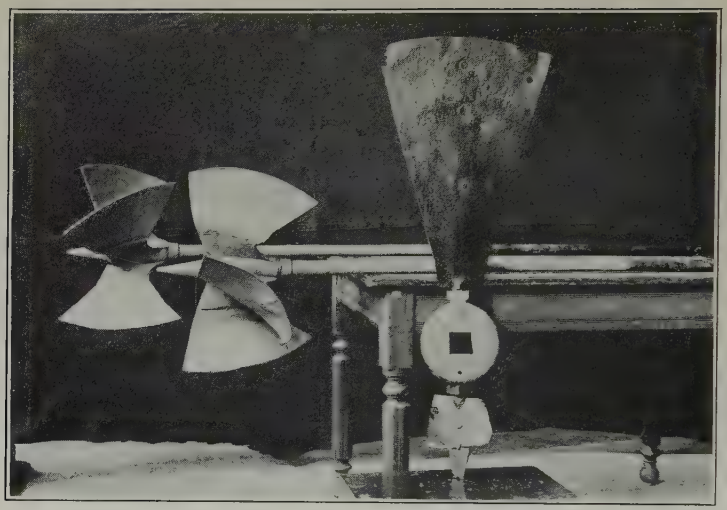
High-pressure steam, at this period, was in very bad repute. Watt had established limiting figures of two and a half to three pounds to the square inch; after some trials of high-pressure boilers, he had flatly refused to consider building or testing any more. For that matter, as late as 1838, Brunel's *Great Western* ran on very little higher pressure. The fatal accidents resulting from experiments had turned almost all engineers against high-steam; in so many words, they were afraid of it. The colonel alone appears to have been convinced that it must finally come. He was as positive in this as in his belief that the propeller would finally replace all other methods of driving steamboats. His pressure figure was one hundred pounds and up.

Thus far his newest boilers would not stand such pressures for very long. When Robert and John Cox had made several trips in the *Little Juliana*, her boiler, said the colonel,

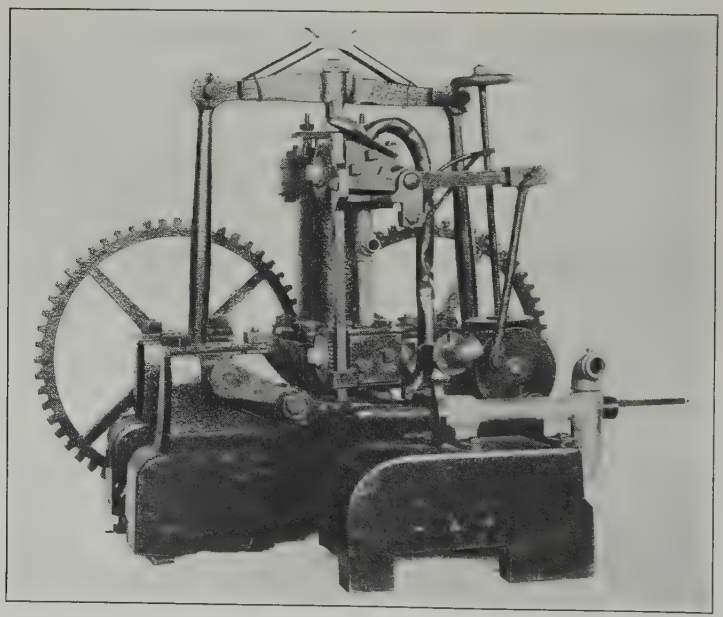
"gave way so as that it was incapable of reparation." The boys, fortunately, were unhurt and quite ready to build a new boiler and have the propeller spinning again next spring. Naturally, these boiler failures made most observers sneer at the "smoke-jack fly." Those who had a rudimentary knowledge of steamboats admitted that paddles, or anything else on the sides, must tend to increase the hull-resistance—so much was obvious. But, with most engineers, the prevailing object was to "take a grip" on the yielding medium, water; that this could be accomplished by wheels in the stern was, in the majority opinion, an absurd theory. But the colonel believed it. Low-pressure steam, with the incidental losses, cut propeller efficiency to a figure we should consider ridiculous. One screw would scarcely move a boat of any size; if the boat did move, it was hard to steer because of a tendency to turn in circles. These developments led the colonel to state what he considered the proper factors to solve his problem.

A multitubular boiler, which would stay tight and produce;
High pressure steam;
A quick-moving engine, directly connected to the propeller shaft;
Short, four-bladed propellers; and
Twin screws.

It takes very little engineering knowledge to recognize in this statement the germ of modern transatlantic passage in five days or less. The *Mauretania*, queen of the seas, traces a proud lineage back to a humble origin in the *Little Juliana*. Similar descendants, through a collateral branch, crowd the highways of the earth and the great circles of the sky. And the whole family is little more than a hundred years old.



THE COLONEL'S BLADE OF 1804 AND THE COPIES OF 1844



THE ORIGINAL TWIN-SCREW ENGINE

In detail, the colonel's engine was simple. The piston-rod ended in a yoke at the top, to which the shackle-bars were bolted. These, acting against one another as the piston rose and fell, served to give the parallel motion of modern slides and kept the piston-rod in alinement. Cranks, bolted to the lower ends of the shackle-bars, carried upon their after ends the spur-wheels, or cogs, through which reciprocating motion was translated into the rotary motion of the propeller shafts. The valves were two-way cocks, a modification of the one-way type used by Savery and Newcomen; at each end of the cylinder one cock provided for both admission and exhaust. Valve motion was derived from a crank on the forward end of one propeller shaft, this crank turning a rack whose teeth meshed with the wheels of the plug-cocks—a design similar to Watt's rack-and-arc. Properly described, the engine was double, direct acting, and non-condensing.

Twin-screws formed the subject of many of the colonel's letters. Of these the most comprehensive was one written to Dr. Robert J. Hare, the Philadelphia physicist who wrote many scientific papers and became noted for such inventions as the oxyhydrogen blowpipe. Dr. Hare had written the colonel a description of experiments by a certain Mr. Weedon, and the colonel's letter was sent in reply.

Hoboken, Nov. 16th, 1805

I have received your favor of the 8th, communicating to me . . . Mr Weedon's contrivance for propelling boats. The attention . . . warrants my warmest acknowledgments, as it evinces the interest you feel . . . in my project. . . .

With the surprising effects of the Chinese scull, I have long been acquainted. And it is now five or six years ago that I made an attempt to apply a steam engine . . . to the purpose of working a system of sculls attached to the stern, but failed . . . principally owing to the imperfection of the boiler. . . . I am satisfied that my present mode of applying the

power of a steam engine . . . is preferable to any adaptation . . . of sculls with an alternate movement. . . .

You will recall the description I gave you when I first had the pleasure of seeing you at Hoboken. . . . An axis passing through the stern . . . a number of arms like a windmill . . . [with] the most advantageous obliquity attained after a few trials. . . .

The principle of an oblique stroke is the same here as in the sculls, but the continuity of movement . . . gives greatly the advantage over alternation . . . both in . . . loss of time and the resistance of the fluid. . . . Besides, [sculls] must give the boat a wriggling movement, and a tendency . . . to elevate and depress the stern. . . . They would also be . . . affected by the swells in rough water and, like the paddles I had some thought of using, be an awkward appendage to the stern. . . . The consideration that determined me . . . to make trial of the paddles, was merely to avoid the necessity of giving the boat a draught of water too great to pass the overslaugh at Albany. This objection to the use of wheels I expect to obviate by an increase of . . . number . . . and a diminution . . . of diameter. It is absolutely necessary to have two, revolving in opposite directions, to prevent the tendency to rotation which a single wheel gives the boat.

Since you were here, I have made a fair experiment on the wheel compared with oars. Two men were placed at two cranks by which a wheel in the stern of the boat was turned. With a stop-watch, the time of passing over a given distance was precisely ascertained. After making sufficient number of trials, the wheel was taken off and the same men were furnished with oars. The result was . . . a few seconds in favor of the wheel.

It is unnecessary to observe that the wheel must have worked to much disadvantage. The proper angle of obliquity was not attended to; besides, the wings were made with a flat surface, whereas a certain degree of curvature was necessary. And, in order to give a due submersion to the wheel, the axis was inclined at least 30 or 40 deg. below the horizontal line. . . .

One very important consideration in favor of these wheels

is the facility with which they can be defended from all external injury by placing them in the stern, thus:

My foreman promises to have the engine a-going in the boat in about two weeks time. I shall embrace the first opportunity of acquainting you with the result of my experiment.

Dr. Hare replied promptly.

Philadelphia, Nov. 19, 1805

It seems really impossible to discover anything, in the path of investigation in which you have trodden, which . . . has not either been contemplated or essayed by you. I had a full opportunity of discovering my own insufficiency in this respect when I had the pleasure of your society at Hoboken, & from the experiment . . . mentioned in your letter . . . it appears that the ingenious Mr Weedon is equally incompetent.

The contrivance of the wheel . . . seems to me an improvement. . . . I certainly did not understand this to have been among the methods contemplated by you, or I should not have called your attention . . . to Mr Weedon. This may not, however, be altogether useless to this gentleman, in showing him how far he had been anticipated, saving him the expense of trying what had already been essayed or procuring a patent . . . wherein he had no priority. . . .

The mistake into which Mr Weedon has fallen, of presuming himself the first constructor in the application of the scull to the steam engine, evinces the justness of the argument in favour of a publication of your experiments, as they are such as genius will be likely to repeat, unless forewarned of anticipation.

The present volume represents a belated attempt to act upon Dr. Hare's advice. The design of the colonel's propeller, carried on struts outside a vessel's hull, has an obvious similarity to the modern type. It offers an interesting comparison with the efforts of later men, such as F. P. Smith and John Ericsson, who took out their patents in 1836.

Bourne's treatise on the screw propeller names these two as the most ardent propeller men of their day, and declares it to be probable that "the exertions of either would have served to introduce the screw into practical operation." To one or the other—to Ericsson chiefly—other writers have ascribed the *invention* of the twin-screw, a claim plainly unfounded. Ericsson's early American plan was that installed in the old gunboat *Princeton*—two screws in line, the shaft of one inside that of the other, and the "wheels" themselves were more exactly drums, set with vanes. The rudder was at first placed, not between the screws, but forward of them; later, when one shaft was removed, this rudder was shifted back. Hence the *Princeton* was not, as we understand it, a twin-screw vessel at all. As an effort of the distinguished Swede, parallel to that of his American predecessor, she admirably illustrates the slow strides made by steam-engineering in an interval of thirty years. It may incidentally be worth noting that the men who gave Ericsson his greatest encouragement were Francis B. Ogden of the Jersey family whose interest in steamboating had been aroused by the success of Colonel Stevens on the Delaware, and Commodore Richard Stockton, a relative of the colonel's. Fortunately for the future of the propeller, history repeated itself in a generation equipped with better materials and—even among its seagoing shellbacks—more open-eyed to the power of steam.

The hub of the original Stevens propeller had adjustable blades, secured by a round shank fitting corresponding holes in blade and hub. The blade axis was perpendicular to that of the shaft, the pitch being changed by a slight turn of the shank. It was to this design that the colonel referred when he spoke of attaining "the most advantageous obliquity of their angle." His principle is readily to be recognized as that of

Griffith when, in 1849, the latter obtained adjustment of pitch by casting a plane-surface flange at the base of the blade and bolting this to a plane cut into the hub. It is the common method of to-day, but in Griffith's time it was held to be a great step forward.

The colonel's particular hub and blade, illustrated here, have some further history of their own. In 1844, they appeared in the New York District Court as eloquent and decisive witnesses against J. B. Emerson in a suit with Ericsson over priority in propeller invention. In that same year the American Institute, before its annual fair in Niblo's Garden, received a letter from the colonel's son Edwin.

New York, Oct. 17th.

The sons of the late Col. John Stevens, of Hoboken, beg leave to exhibit, at your Fair, a small Steam-boat.

The Engine and Boiler are the identical ones used in 1804. The original boat, being built of wood, has of course long since gone to decay. The Propellers are made as precisely like as possible to the drawing and description given by Col. Stevens in a letter addressed to Robert Hare, Jr. . . .

The performance of the boat was so satisfactory that our father immediately commenced to put an engine in a Boat with the intention of making her a passage Boat to Albany, but the machinery taking up more room than was contemplated, she had not sufficient accommodations for passengers.

The model of this Boat, Engine, and Propellers are also exhibited—together with the only portion of her original Propellers that can be found.

The institute appointed a committee to test the engine and report upon its authenticity. One member of the committee was James Renwick, with whose knowledge of the original boat we are already familiar. But there were other features that make the report really a first-hand one.

The Judges appointed by the American Institute to examine a small steam boat and the model of a steam engine exhibited at the late Annual Exhibition by the representatives of the late John Stevens, Esq., of Hoboken, respectfully Report:

1. That the date of the construction and use of the boat, engine, and propelling apparatus, was fixed by the recollection of two of the members of the Committee of Judges, at a date not later than 1805. One of the members distinctly recollects that he saw a boat belonging to Mr Stevens, fitted with a steam engine for propulsion, afloat in the North River, and recognized the engine exhibited as that which he then saw. The other member saw the sculls or propellers at the machine shop where they were made; and their united recollection carried back the occurrences of these separate facts to the above mentioned year or the previous one.

2. The fact of Mr Stevens having invented modes of propulsion of the character of that exhibited, long before any of the analogous forms that have since come into use, was further established by a letter addressed by him to one of the above mentioned members of the Committee under date of February 20th, 1826.

It might have been reasonably expected, and it would have been no disparagement to the merit of the late Mr Stevens, that, at so early a period in the history of steam navigation as 1804, and in so imperfect a state as the mechanic arts were at that time in the United States, the performance of the engine and the speed of the boat impelled by it, should have been inferior to what has since been agreeably disappointed. By several experiments made in April last, at Hoboken, under the personal direction of one of the members of the Committee, the speed of the boat, in which the engine referred to is now placed, appeared to be a small fraction more than eight miles per hour—the boat being no more than thirty two feet in length and six feet beam. The experiments referred to were made under circumstances unfavourable to so small a vessel, there being a strong breeze and considerable swell.

While, therefore, the Judges are not satisfied that it falls within the scope of their powers to recommend, for one of the premiums of the American Institute, an invention of so old

people of their powers to recommend for one of the premiums of the American Institute, an invention of so old a date, they are of opinion that it is worthy of the highest complimentary Notice which the regulations of the Institute will admit. They further concur in opinion that it is due to the memory of one who at a period too early to render his discoveries available, had anticipated many of the improvements in Steam navigation which have yielded fame and fortune to others, that there should be entered upon the records of the Institution the fact that it has been established by unquestionable evidence that John Stevens of Hoboken had at a date prior to 1805 invented and used that mode of propelling vessels by steam, now known as "the Propeller", the right to a patent for which, is a subject of litigation between others, the claims of none of whom extend back ~~within thirty years of the~~ to a date as old by thirty years as the experiments of Mr Stevens —

All which is respectfully submitted

American Institute New York
17th June 1844

Jas Renwick Jas
John Allen
Joseph Curtis

THE 1844 REPORT ON THE PROPELLER OF 1804

a date, they are of opinion that it is worthy of the highest complimentary Notice which the regulations of the Institute will admit. They further concur in opinion that it is due to the memory of one who, at a period too early to render his

discoveries available, had anticipated many of the improvements in Steam Navigation which have yielded fame and fortune to others, that there should be entered upon the records of the Institute, the fact that it has been established by incontestible evidence that John Stevens, of Hoboken, at a date prior to 1805, invented and used that mode of propelling vessels by steam now known as "The Propeller," the right for a patent to which is a subject of litigation between others, the claim of none of whom extend back to a date as old by thirty years as the experiment of Mr Stevens.

All of which is respectfully submitted

Jas. Renwick
John D. Ward
Joseph Curtis

American Institute, New York,
17th June, 1845.

Without doubt, joints made in 1844 were tighter than those of 1804. Edwin and Robert, wherever they remade a joint, painted it yellow to identify it. For all that, the engine's performance after forty years of idleness and deterioration stands as the colonel's answer to those steamboat engineers of his day who maintained that the practicable limit of speed for such craft would be about six and one half miles an hour. In any survey of American engineering, that boat is a bench-mark. It now lies in the Smithsonian Institution, close beside a model of the *Leviathan,* and a comparison worth making is that between the screw propellers of the two ships.

When Renwick and his associates had sent in their report, the American Institute, through its chairman and General Thomas Hardy, added a comment of its own:

The execution of the work shows the age of infancy in mechanical construction in this country and on this account it is a *gem;* it equally shows the marks of ripe intellect and skilful

adaptation to the object sought to be attained, still unsurpassed by present maturity.

Although high pressure had a bad reputation in America, the colonel believed that in the real home of the steam-engine —England—there must be some men of more advanced views. Once in contact with these, he might progress toward better means for driving his propellers and hence not have to revert to paddles or side-wheels. More minds, better boilers. Not being able to spare his own time for a European trip, he concluded to send one son and chose John Cox, as the eldest, for the purpose. He was to go with two objects—a British patent for his father's multitubular boiler, and an interview with James Watt on high pressure. Although Watt was well along in years, it was the colonel's hope that the mind that had made the steam-engine practicable would always remain progressive. If Watt could be persuaded to build boilers producing, say, forty pounds to the inch, a great step would have been made. Therefore, in the early spring of 1805 John Cox sailed for England.

He was twenty when he began writing his letters to his father and sending them at the long intervals commonly elapsing between packet sailings. Except for the addition of a word here and there, obviously omitted from a hasty scrawl, his letters stand as they were written and offer the best possible account of his experiences. The first was dated London, April 25.

I received a few days ago your letter, written the day after I sailed. I was extremely sorry to hear that Mama is again troubled with a visit from that most irksome companion —a pain in the face—but as it is extremely unfashionable to make long visits, I hope he has ere this taken his leave.

I have as yet little more to say concerning the patent, as

it progresses very slowly owing to the tediousness of the necessary forms. There have been a dozen Caveats, at least, entered against it, so that we were obliged to summon each of them to appear before the Attorney General; and it was necessary to give them a fortnight warning, that they might prepare their several specifications for his inspection, to enable him to determine whether they clashed or not. Yesterday was the day appointed, but there was but one among the number who appeared, and he came to withdraw his Caveat as he found it [yours] did not interfere with his invention. So we got rid of the Attorney without much trouble.

The next and last step will be from the Attorney General's to the Chancellor's, at an interval of ten days. Then, those who did not make their appearance at the Attorney General's must do it here if they come on the stage at all. For it is the last act and concert scene. But the expence here is very heavy; for, in proportion as his Chancellorship excells the Attorney in rank and Consequence, so in proportion does the expence here exceed the expence at the Atto. For that reason, I suspect we shall not be molested by any of them. They might have argufied the topics at the Attorney's for five pounds, but here it may cost them an hundred. And, if they should, it will make this difference to us—that, instead of one hundred and fifty, the Patent will cost two hundred and fifty pounds Sterling. This is upon the supposition that it does not interfere with any of them for, if it should, there is an end to the Patent, on that ground at least. But, whether we do, or do not, succeed, it will make no difference in the expense, owing to a law peculiar to these proceedings (which very much resemble lawsuits, for there is both Plaintiff and Def[endant]) which is, that each party pays his own costs. But I do not think it probable they will give any trouble, as I have not heard of any engine or boiler upon the same principle or construction with yours.

I dine frequently with Doc. Pierson, who has promised—as soon as the Patent is completed (which will be the case in a few days more)—to furnish me with letters to Watt and Bolton, with whom he is sufficiently acquainted for that purpose.

I could not send you the books before as a great many of the numbers were out of print and the Editors of the Repertory were obliged to rummage half the booksellers in town for many of those which I have sent—thinking it better to give them to you incomplete than not at all.

I have but very few acquaintances, for the distance and reserve of the English does not suit my temper or disposition, and I very often find myself extremely lonesome, even in London. Mr Kennedy has returned to America and Mrs Kennedy gone to Scotland, so that I have not seen a single soul with whom I could familiarly shake hands and ask how he did, since I have been in England; although the people here are as numerous as the sands on the seashore, all pursuing the same object in many different ways—jolting and jostling each other at every step. Yet each is so taken up with his own concerns that he seems to be as much alone as if he were in the midst of a forest.

To give you some idea of what sort of conscience the people have here, I will select one article from my dinner bill of yesterday—one fowl, 9s 6d. The rest was proportionately dear, so that as for me, who do not understand their tricks and am not the greatest economist in the world, I cannot for the life of me live in London for less than ten guineas a week! That is merely for Lodging, breakfast, dinner, and supper, without allowing a sixpence for amusements and hackney coachmen who, by the by, I believe to be the greatest set of rascals in the world, for they cheat me in every way. At night, if I give them a guinea to change, they are certain to return me all bad shillings and, perhaps, a pocket-piece instead of half a guinea, into the bargain.

As for the servants, they are the most troublesome and continual tax you can conceive. If you stay but one night at a coffee-house, you are accosted by a dozen of them at least: "I hope you will remember the porter, Sir! I hope you will remember the waiter, Sir! I hope you will remember the Chamber-maid, Sir," etc, etc. And you cannot escape them for the soul of you, as they receive hardly anything else from their Masters besides the privilege of annoying every gentleman

who comes within the doors. Now, those who are accustomed to them and understand their tricks, do not mind them; but as for me I dread them as I do a rattlesnake or bloodsucker, for it is as much as your life or reputation is worth to go away without paying them. Well, if you have not any change, you must give them something to get changed and then they are sure to stay an hour or two, in hopes of wearing out your patience. And they have succeeded more than once with me for, if you have an appointment or any business to do, you must either break your appointment or lose your money. Their memories are so excessively short that, if you should return again in four or five hours and ask for your money, they stare you in the face—"Lord, Sir, you must be mistaken, sure! Here, James—did you change a guinea for the gentleman?" And then, if a bell should ring, they are off with "Coming, Sir, coming!"—leaving you to whistle for your money, if you like.

Not long ago, I bought myself a beautiful watch for which I paid thirty guineas. But the London gentlemen were determined to ease me of that watch; I had not possession of it for above a week when, one night as I was coming out of the theatre, it was stolen from me in spite of my teeth. Ever since the accident, if I go to the play, I sit all night with my hands upon my money and, if anybody comes too near me, or jostles me in the least, I look first in his face and then at my Pocket, as much as to say—as the man said to me in the gallery at New York—"Pray, my good friend, do not come quite so near my pocket."

Give my love to Mama and tell her I begin to be of her opinion concerning the nimbleness of Londoner's fingers. Remember me to Mrs Charlton and all the children—tell her I am not likely to fall in love with any of her countrywomen.

Getting the patent actually approved was not so simple as John Cox had begun to hope. When next he wrote, he had come into contact with that Dickensian stumbling-block, the *Barnacle* family of the Circumlocution Office, and this he found it difficult to move. Moreover, a Mr. Hornblower

had entered a protest—the same man whom the British records note as "cast in his suit against Mr. Watt." John Cox's letter was none too cheerful.

May 30, 1805

I am extremely sorry I could not send the books as I promised, by the last ship; but really it was not my fault. The Editor of the Repertory disappointed me after having promised faithfully to have them ready by the time the vessel sailed. Instead of that, he had not procured above one-half. I hope you will not impute it to any neglect of mine, for I have said and done everything in my power to induce him to be expeditious. He has at last got them together & sent them on board, & you will receive them together with this letter.

I am sorry to say the Patent is not yet completed; you cannot have the least idea of the innumerable and unavoidable difficulties and delays attached to the forms necessary. At the time I wrote, last, I expected it would certainly have been completed in a week from that date, as a day was appointed for its passing the Privy Seal. But a Caveat from a distant part of the Island was entered against it, two days before the expiration of the time, by a Mr Hornblower. It will be brought before the Chancellor in two or three days, when there is not the least shadow of a doubt that we shall ultimately succeed. Till the Patent is completed, I can do nothing, for Dr Pierson advises me not by any means to mention it, or apply to Watt and Bolton till I get the Patent.

There is a gentleman by the name of Turner, a great mechanical genius, with whom I often converse upon the subject of steam. I gave him a description of your boiler, which he very much admires. He says he has never seen nor heard of anything similar to it in England. The nearest approach that has been made to it was the passing of a few pipes through the water, into which the fire was introduced. They have never yet discovered a mode of making a boiler sufficiently strong to work with high pressure steam; that is, with any degree of safety. He told me there was a gentleman of his acquaintance who constructed an engine to work with high steam; with which,

upon trial, he was very much delighted and intended taking out a patent. But, on visiting his engine, next day, he found his boiler cracked in many places, which gave him such a Fright that he gave over all idea of ever having anything to do with high steam again. This Mr Turner has discovered a kind of clay that does not contract in the smallest degree when exposed to the most intense heat; also a very ingenious method of curing smoky chimneys by raising a brick wall about six inches from the back of the fireplace; by which means the air between the wall and the back becomes rarefied and therefore ascends and creates a draft. There must be no hole in the artificial back.

I have very little news, except that I am spending my money ten times faster than I had any idea of—so fast that I fear at the expiration of three months I shall have but little to spend. I have not yet attained, nor do expect for some time *to* attain, the art of living—that is, cheaply—in London. Most of their bills and charges amount, in my opinion, almost to absolute robbery.

They are still squabbling and debating in the House of Commons about Lord Melville, when—in my opinion—they had better be attending to Bonaparte and following him, if possible, through his moves and intricacies. For, by manoeuvering his flat-bottomed boats and sending out expeditions, he still contrives to keep them in a most anxious state of alarm.

I have been for the past six weeks impatiently expecting a letter from home, as I have had but one since my arrival & that was dated the day after I sailed. I hope that all mine have reached you; my last you certainly received, as I wrote by a gentleman who was going to Boston, and he promised as soon as he arrived to enclose it and put it in the Post Office. Mr Monroe and Count Rumford are both in Paris.

I have as yet formed very few acquaintances and consequently very often feel lonesome. Give my love to Mama and all the family, and tell them I begin to long very much to see them again. Tell Mrs Charlton I think more than one-half of her countrymen (no offence meant) and more than three-fourths of her countrywomen, great rogues.

Evidently a turn for the better did come during the next week—although this did not apply to John Cox's private purse. The succeeding letter bears the date of June 4.

I have the satisfaction of informing you that the Patent is at last completed and dated the 31st of May, and also that we have completely jockey'd Mr Hornblower out of his Caveat. He said he wished to settle the business amicably; there was no necessity of going before the Chancellor. We could adjust the matter between ourselves by explaining reciprocally our inventions. But the Editor of the Repertory advised me by no means to do any such thing, as he might take advantage of me by saying it interfered with his invention and insisting on having a share of the Patent, or else not suffer me to take one out. So I left it entirely to his direction and he, by some hook or crook, while Mr. Hornblower was writing backwards and forwards, got the Patent completed so that, at least, there is an end of that, after having waded through Caveats and obstacles innumerable, wandering from Seals to Privy Seals, from the Chancellor's to the Attorney's, and vice-versa.

I shall leave London for Birmingham tomorrow or the next day, as soon as I have received my letters from Dr Pierson. I shall inform you by the first opportunity (which by no means occur as frequently as I expected) what success I meet with. I wrote a few days ago by the ship *Otis*. I mentioned in that letter a Mr Turner who had discovered a clay. . . . He sent me, a day or two ago, a specimen . . . which I received in time to transmit by the same ship. I mention this here as the Packet by which I write sails on Wednesday and I think it probable she will reach New York before the *Otis*.

I recollect you told me . . . not to be afraid of writing the same thing twice. . . . As I always like to do as I am told, and dislike undutiful children, I transcribe verbatim a part of my last:

"I have very little news to tell you, without it is that I am spending my money *twenty* times *faster* than *you do or did suppose*, and *ten* times faster than even I had any idea of—

so fast that I fear before the end of three months I shall have but little *to* spend."

I have not time to go any farther for, as the Packet sails tomorrow, which is the first Wednesday in the Month, the mail closed tonight. And this is his Majesty's birthday, and they are making such a confounded racket that if I had ever so much time, and ever such a mind, I could not recollect one word more of it. Everybody, every thing, and every brain in London has turned topsiturvy and I don't think mine is much better than the rest.

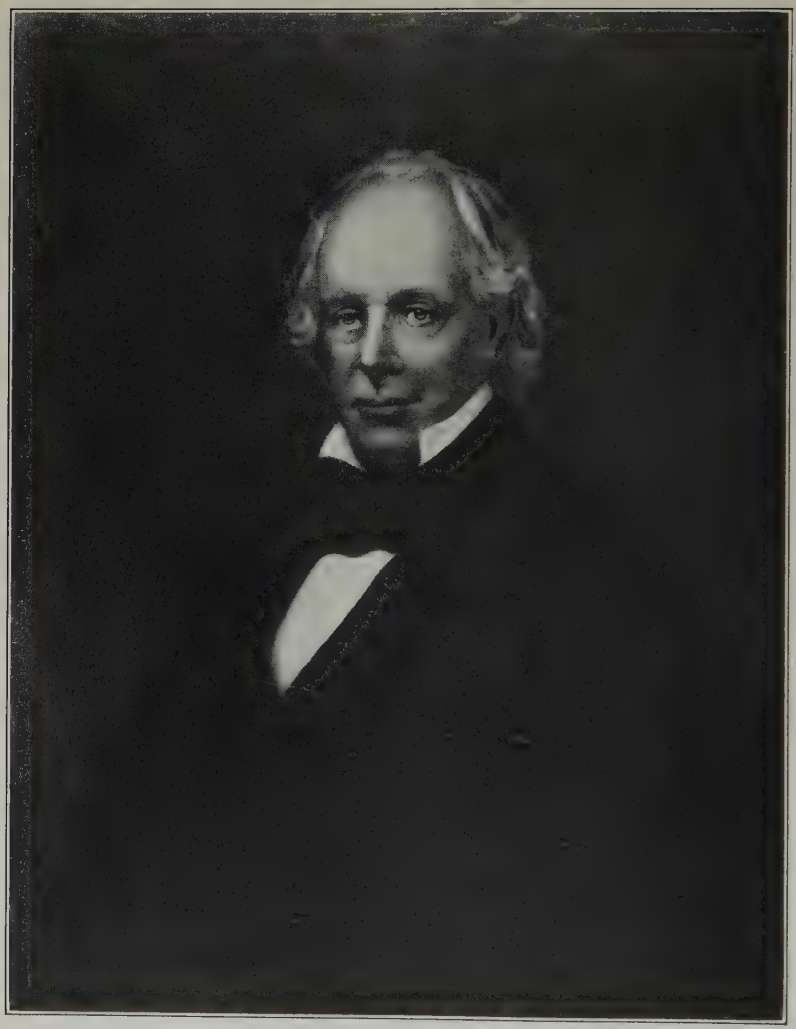
I think they are all getting as mad again as ever—one-half the Nation pulls one way, and the other, the other. They are now hawling Mr Pitt over the Coals. The Irishmen are beginning to play their old tricks again. Lord Nelson is wandering about the Mediterranean without meeting a single French ship, and the West India Expedition is returned safely to France again. I think they are getting into confusion here. I have not a bit more room. Give my love to Mama and all the family. Tell Robert he must write to me. Give my love to John Livingston and tell him I expected a letter from him before this time.

With the British patent at last in his hands, John Cox prepared for the next object of his trip—an interview with Watt. It took another three weeks to come within sight of this, for there was no further letter from him until June 24.

Yesterday, as I was walking through the Strand, I unexpectedly met Mr MacVicker, who informed me his son had a letter for me, which he sent me a few hours after, dated the 13 of May. I am extremely glad to *hear* you are all well, but should like better to have ocular demonstration of it.

In my last, I informed you the Patent was completed and that I intended to set off the day following for Birmingham. I waited upon Doc. Pierson, but he informed me that Mr Watt was in London. I was pleased to hear that, for I expected it would save me a jolting—but not so.

I found Mr Watt and delivered to him your letter expres-



COMMODORE JOHN COX STEVENS

sive of the terms upon which you wished to engage with him, together with the one in which the Engine is described. After having read them, he told me that he had given up all concern in the business long ago and that I must apply to Watt or Bolton, Junior. But, at the same time, he would candidly tell me that he did not think they would engage in it, as they had uniformly refused to do such a thing, and, besides, we had been entirely anticipated by Mr Wolf. I told him I would readily allow that Mr Wolf, as well as a hundred others had made experiments with high steam, but it did not follow that we were anticipated as to the most advantageous mode of producing and applying it. If he would give me leave I would explain the matter more fully to him. He then said it would be to no purpose to give myself that trouble, as he would give me his son's direction and I had better see him about it. He returned me the letters, said you did him a great deal of honor, and wished me a good morning—he was *particularly* engaged. I then left him and went directly to Menet and Feeto [?] and got a letter of introduction to Bolton, Junior, and set out with my model and a heavy heart for Birmingham; arguing, from the reception I met with from the old man, no very great success with the young one.

Upon my arrival . . . I delivered my letter . . . to Bolton, Junior and explained the business. He told me in the first place that they had never deviated from the principle (nor even varied the construction) from that upon which they first set out. In the second place, as to high Steam, that was entirely out of the question. From repeated solicitations from Mr Wolf and other persons, they had at last consented to work some experiments, [agreeing that] if they answered as well as Mr Wolf's sanguine expectations led him to suppose, they would then adopt the principle. But, after having made thousands of different experiments, they found the practice to fall so far short of the theory that they were obliged to discard the principle absolutely and entirely.

I then told him that the possible modes of producing and applying were so infinitely various that it was probable there were yet remaining many in which an engine upon that principle might be constructed. I flattered myself that if he would

take the trouble to read your description or permit me to show the model (which I had with me) of the engine, he would allow that it was not only a new but a very advantageous mode of producing, containing, and applying high steam. He said I did him a great deal of honor in proposing to confide the construction to him. I said it was no secret, as I had . . . a Patent. He then replyed that it was detaining and giving me unnecessary trouble, as he had made up his mind never to engage in any other engine . . . upon that principle. I then asked if he would not construct an engine and make an experiment at my expense. . . . He said he had such a multiplicity of business and so many engines on his own plan to construct that he could not possibly enter into it or have anything at all to do with it. He was extremely sorry that, after coming so far and giving myself so much trouble, it was not in his power to assist me in any way whatever.

I staid as long as I possibly could stay, and said all I possibly could say without being rude, to induce him to enter into your view. But, so far from that, he would not even read the description or look at the model. So I was obliged to return to London with a heart more sad, if possible, than when I left it. For on the supposition that Mr Bolton would engage in it rested almost all my hopes of success. It was that which gave me patience to wade through all the tedious forms . . . the Patent was obliged to pass before its completion.

I feel myself in a situation extremely perplexing and uncomfortable. I have no friends or relations to whom I can apply for advice. Doc. Pierson is so continually engaged that it is not possible for him to devote much time to me. Mr Coxe is a Merchant . . . and knows no more about engines than the Man in the Moon, and General Reid is so old he can hardly see, hear, or speak. And those are the only persons with whom I am well enough acquainted to ask for advice.

Even if I wished to have an engine constructed without the assistance of Watt or Bolton, and had somebody to stand security for the payment of it—which I assure you is no easy matter among the English—the chances are a thousand to one they would treat me in the same way, and . . . I should never be able to get it *right* or *tight*. So I begin to feel very unhappy

and . . . in want of your assistance. I *thought* myself extremely miserable in New York, but I *find* myself much more so here. I have not a single companion suited either to my age or disposition; my unhappy, thoughtless, lawless temper brings me into trouble, go what part of the world I will. My money is almost all spent or stolen, for the price you pay for everything you eat and drink amounts to absolute robbery, especially to an American.

I shall wait anxiously for an answer to this letter, to know what course I am to pursue, for I am actually at a stand. Yet if there is still any possibility of my getting an engine built or set a-going, I certainly will endeavour to do my best. But if I should fail, I hope you will not blame me too severely; as to my business with Watt and Bolton, nobody, I am certain, could have had any better success. Tell Robert I would give everything I have in the world, even the coat off my back, if he was with me to assist me with his advice.

The reference to Robert is a typical one. John Cox never had the elder-brother attitude toward his brilliant junior. But, since the faces of Watt and Boulton were so firmly set against high pressure, it is doubtful whether Robert could have persuaded them even to look at the model, much less to build an engine. With their long experience it was perfectly natural that these engineers should believe that no youth of eighteen could tell them anything about steam. Later on, they—the English—were much more generous; far more has been said and written of Robert's achievements in British publications than in American ones.

One more letter gives the conclusion of John Cox's trip. It was written by the veteran General Reid to Colonel Stevens.

. . . Your son, considering his years, appears to be a well informed young man and, from the short acquaintance I have had of him, he promises to be a Credit to you and to his

name. He passed several weeks at Bath and, like all other young men of the present age, has perhaps spent more money in that gay place than he would have spent in London. He has therefore wisely determined to return to New York, having accomplished his purpose in procuring for you a Patent . . . which was attended with more expense than he expected.

. . . To pay for his passage in a ship bound to Philadelphia, and to discharge some debts which he has contracted here, I have supplied him—tho' at this time inconvenient to myself (as he knows)—with one hundred pounds Sterling, which . . . I make no doubt you will remit to me on his arrival. . . .

I sincerely wish your son a safe voyage and hope you will have the pleasure of seeing him arrive safe and well at New York.

John Cox's first visit to England ended in gloom. Forty years later, when he went back there at the head of the most noted group in the history of international yacht-racing, he met with a reception that completely reversed his early opinion of the country and its people.

CHAPTER TEN

At home, the colonel was again very busy with the Manhattan Company. New York, deplored by "Blount's Stranger's Guide" of the day as having "too many swine in the street," did not then recognize any groups of half-naked children spending midsummer afternoons in the merciful streams from open hydrants. The gallant volunteer firemen who struggled with the famous Water Street conflagration were, in everything but courage, a long way from the split-second organization we take as a matter of course. Anything like a fire-boat, prepared to drive a great stream into the first flicker of flame from a warehouse window, had no place in early nineteenth century pictures of the river. Hence his fellow-citizens, picking their way along filthy sidewalks, formed the colonel's only precedent when, on March 4, 1805, he wrote to De Witt Clinton, the mayor:

> The command of a certain and never-failing supply of water for extinguishing the fires, and for washing and cleansing the streets during the summer months, is an object of immense importance to a great and opulent city like this, subject to the ravages of fire and pestilence. To effect so beneficial a purpose, no expense, however great, should be regarded. The loss sustained by the late fire in Water Street has been estimated at one million of dollars, which is fifty times as great a sum as would be necessary to carry into execution the plan which the subscriber now begs leave to offer for consideration by the Corporation. . . .
>
> For a sum not exceeding ten thousand dollars, he will contract, giving any security for performance that may be re-

quired, to furnish . . . within a reasonable time, a steam engine which will be connected with a fire engine and forcing pump; the whole to be placed on board a vessel, under cover and well secured from the weather. The vessel to be made capable of being easily transported from place to place on the river, as occasion may require, by the power of the engine with a very simple machinery.

The engine will be capable of delivering into a reservoir, to be placed in the park, fifty feet above the level of tide water, one million of gallons of water within twenty-four hours. From this reservoir the water can be distributed into all parts of the city for the purpose of washing and cleansing the streets. The engine, at any time, to be brought into complete operation within less than half an hour from the time the fire shall have been lighted under the boiler. The vessel and covering for preserving the engine from the weather to be at the expense of the Corporation.

On this question of sanitation the colonel also wrote his friend Dr. David Hosack, then the city's health officer:

. . . The Mayor views it as an object of great importance to the welfare of the City, but at the same time suggested a doubt whether *salt* water would answer . . . for washing the streets. It is readily admitted that the experiments of Doct. Macbride and Doct. Pringle seem to prove that a small proportion of salt has a tendency to promote putrefaction. But I can assert from my own observation during a residence of twenty years at Hoboken, that those . . . who live in the vicinity of salt marshes, in which there are always pools of stagnant water, are not by any means so subject to intermittent and remittent fevers as those living in the neighorhood of stagnant fresh water. Besides, it is by no means intended, nor is necessary, that the water should be . . . kept . . . in a reservoir, but merely for the convenience of distribution. When the operation of scouring the gutters is finished, not a drop need be left. . . .

Should it appear . . . that the use of salt water would . . .

entirely remove the causes of putrefaction, by removing all animal and vegetable substance . . . I trust you will have no hesitation in expressing an opinion favorable to the plan. . . . Should it be advisable to wash the pavements also . . . on evaporation the salt would be left behind in a crystalized state, which all the world . . . are in the habit of using, as a preventive of putrefaction.

Evidently, the health officers supported the colonel; the official opinion was handed down in due course, March 4:

Having considered the plan proposed by Mr Stevens, of supplying the City with water for . . . cleansing the streets, we are of opinion that it will prove highly beneficial . . . and that no evil can arise from the use of *salt* water. . . .

John Charlton
James Tillary
Wright Post
Wm. Moore.

Out of these small beginnings grew New York's present water system with all its ramifications. Dr. Brown's suggestion that the Bronx River be used as an additional supply was seized upon by the colonel. Prudence suggested, said he, "the impropriety of relying solely upon the Manhattan Wells." He insisted, however, that the Bronx water be brought down in closed iron pipes rather than in an open canal. As for necessary engines, or pumps, he could build these himself or have them built at McQueen's.

Making almost daily visits to New York upon this matter of water-supply, the colonel became more and more impressed with the soundness of his own prediction as to her "first magnitude" destiny, and as to the vital importance of her uninterrupted communication with the mainland. What he meant by *communication* was that great strategic artery along which a nation, like an army, is supplied with food,

clothes, and every other necessity or luxury of life. Farm products delivered promptly at their best market; the mails frequent and on time; goods assembled at the best seaport for foreign shipment, or quickly distributed upon importation; means by which the casual traveler for relaxation or the harassed man of business might proceed rapidly and comfortably upon their lawful occasions—the whole nation's enterprise and activity were included in *communication* as the colonel used the term. While he was confident that steam ferries would soon be in general operation, he was equally sure that these alone would prove utterly inadequate. "From the Bluff at Hoboken," he wrote, "there must and will be a bridge to the upper Battery. The roads from Newark, Patterson, and Hackensack must unite on the west side of Bergen Hill and be carried by a tunnel through the same to the Marsh and hence to the Bluff." The latter of these two predictions is now obvious in the Lackawanna Railroad. In advocating the former, he said that a bridge would "at once make Hoboken a part of New York" and turn the latter city into "the unrivaled emporium of the commerce of the United States." In support of his conviction that such a bridge would mean no material obstruction to river navigation, he offered several plans.

Frankly admitting that those to whom he wrote would doubtless regard the subject as "chimerical," he addressed the mayor and a dozen leading citizens, proposing to begin operations with a floating bridge. Past experience with steamboats led him to say that "from the prejudices which naturally arise against anything bearing the stamp of novelty, and from an aversion and even inability of most men to give their attention to subjects remote from their ordinary train of thinking," few in his circle of friends would fail to regard the idea as extravagant. "But," he per-

sisted, "without boldness and some degree of an adventurous spirit, nothing great can be performed." Since the project was so great and important, why not risk a few dollars on an experiment?

The matter being one of national interest, he suggested the formation of a company under Federal supervision, to be known as "The United States Bridge Company" and to have the object of building bridges over all rivers then crossed only by ferry. Such a company could proceed with the plan which he "had the honor to propose."

> Hollow vessels, well hooped with copper, 42 feet in length, 3 feet and a half in the middle and 20 inches at each end. To save expense in execution, it will be best to make these vessels in three parts of 14 feet each. . . .
>
> They will be enclosed by framework, two of these to embrace the middle compartment at proper distances. Two others, where the ends join . . . the outer compartments, and two more near the middle of each of the latter. . . .
>
> One hollow vessel to be placed under the middle of one set of stringpieces, and the frames morticed and tenanted thereto and secured by braces. The ends of the stringpieces to rest on the frames of two other vessels, connected thereto so as to permit them to move upward and downward. The stringpieces fastened to the frames by chains, and each to be forty feet long. The plank to be laid on the stringpieces, with a railing on each side.
>
> For drawbridges, blocks to be sunk on each side of the river, and the bridge, when finished, to be kept in place by anchors and cables.

That was the gist of the plan. According to the colonel, these vessels or casks would have a sufficient buoyancy to give a reserve of 10,000 for each set of string-pieces. Should this prove insufficient, he would merely increase the size of the casks. In estimating—as he always did—upon the cost

of the experiment, he took the distance across the river as five thousand feet. Allowing a figure for labor that would seem ridiculous in a modern cost-sheet, the figures for this bridge came out at $24,375, to which he added 15 per cent. for contingent expenses. This did not, however, include the two draws, with their necessary gear; the latter to be so made that "they may fly open and shut in an instant." Adding $11,000 for these, he thought the resulting total of $40,000 certainly not excessive.

Such a bridge, said the colonel, should be available for at least eight months in the year but, "as the passage through the draws will occasion some impediment to the navigation, it might not be practicable to obtain from the legislature a grant in perpetuity." He held it would be better to ask for a seven to ten year charter, with the understanding that the company's real object should be to provide "permanent passage which shall in no wise obstruct navigation." Anticipating other objections, he acknowledged that some would declare no joints could stand the "heavy seas" of so wide a river, while others would insist that the "agitation" of the bridge would make the passage "troublesome and at times dangerous." He felt that any one with the slightest knowledge of mechanics must consider these points, but he proposed "to obviate these objections in the completest manner, in a way extremely simple." Suppose weighted chains were attached to the frames, so as to keep the hollow vessels always "completely covered"? The chains would always be under a tension equal to the buoyancy of each set of frames, and thus any carriage passing over the bridge would find it perfectly steady. To save time, he saw no reason why the draws could not be made to open both ways during the day and to stand open "at all times during the night, with lamps constantly lit and so disposed as to direct vessels in

their proper course through." Having built a model, he announced that he would "be happy to explain it to a committee from either House."

Charles Loos, city surveyor of New York, had done most of the laying out of Hoboken. "I have not the smallest doubt," he wrote, after examining the colonel's model and plan, "that a bridge constructed on similar principles might be made to withstand the utmost force of wind and waves, or that it would remain stationary, uninfluenced by the rise and fall of tides and afford a safe passage over the widest and most turbulent rivers." Dr. Thornton, in accepting the colonel's application for a patent, spoke of the design as "an ingenious subfluvial bridge." However, when the colonel held that opposition could conceivably come only "from those individuals who may conceive it prejudicial to their private interests—none of these worthy of the least attention, unless it may be what are called Skippers," he had accurately gauged the situation. Shipping men demurred that their trade, both across and along the river, would be snatched out of their hands by truckmen operating over the bridge. The East River and Buttermilk Channel were churned white by pittyaugers, pulling across to protest against any Long Island experiment; on the Hudson side of Manhattan the clamor was just as loud. None of these, declared the colonel, ought to have "weight with any member of the legislature, unless considerations of a party nature become unhappily involved in the question." To begin with, all he asked was that his bridge, on one river or the other, be tried. But the mob's voice was raised. Floating bridges? Never, while they were alive to fight them. The legislative ear heard the cries, the charter failed—and the colonel promptly presented his other plan.

"It is apprehended," said he, "that a floating bridge will

cause too great an interruption. I now propose a permanent bridge, with reaches of so great a height and so wide a span as to admit vessels of every description to pass through freely." Spans of two hundred feet were already in use; why not, then, build spans of six hundred feet? He advocated oak timbers rather than the usual pine, and advised shoeing the timbers with iron. The arches should be curved "vertically as well as longitudinally," with the ribs "firmly connected by diagonal braces, laid and let into each other in the form of lattice." At low water mark the bridge piers were to be thirty feet wide; or, if this appeared too great an obstruction, cast-iron cylinders were to be substituted. Ice-breakers, set at forty-five degrees and faced with iron, would protect the piers in winter.

"In a military point of view," he pleaded, "the advantages of bridges cannot be overlooked." During the Revolution the possession of the North and East rivers by the enemy had proved nearly fatal to our cause. Communication between the city and the surrounding country being completely cut off, General Washington had been obliged to abandon New York. "Intercourse between the Southern and Eastern States was also cut off, the country near the banks of the river ravaged; towns, villages, and even Gentlemen's Seats burnt and destroyed. The bridges now proposed would not only intercept the passage of Enemy Ships of War, but they would afford direct communication so that succor and supplies could at all times be thrown into the City." Combining this quality with the feature of not blocking navigation, the colonel thought his plan entitled to a trial. He actually succeeded in getting legislative authority to present a detailed bill of the organization of a permanent bridge company; this with the proviso that he publish his plan in the newspapers. It came out in the "Public Advertiser," the "Eve-

ning Post," "The Albany Register," and "The Albany Gazette," with the added suggestion of several methods of paying for the bridge. One was to make it an aqueduct for bringing Jersey water into the city; another was to follow the London plan and erect houses upon the bridge. Both failed to beat down the wall of "prejudice against the stamp of novelty" which restrained other men from joining in the colonel's effort.

As late as 1884, when Gustave Lindenthal made his design for a Hudson bridge, the same prejudice was effective. Not even the Roeblings' artistic triumph on the East River could convince the Hudson skeptics. In 1890 a Federal charter was granted to the North River Bridge Company, and the report of the House committee sustained John Stevens's long-forgotten opinion when it stressed the national character of the work and the consequent necessity of Federal supervision. At that time the Pennsylvania Railroad could not risk its credit by financing such an undertaking, but its president, Samuel Rea, recently had this to say upon the subject:

> While the day for the construction of such a bridge in lower New York City, over the Hudson, primarily for steam railroad traffic, may have gone, the immense growth of passenger and highway traffic across the Hudson River, which has occurred since the development of the automobile and the Hudson and Manhattan Railroad—with the continued rapid development of the Newark territory—keeps the project fully alive. I, for one, believe that the cost of such a bridge for highway, suburban, and local traction would be fully justified; that its revenues would carry its capital investment and would ultimately amortize the cost and give a free bridge to the public.
>
> New York, the chief beneficiary of such an important transport artery, so located as best to serve the bulk of the traffic, has not yet awakened to its necessity and may not, until in-

tolerable congestion will compel its construction. When that time comes, it will be found that the wisdom of Congress was fully justified in creating the North River Bridge Company with its broad powers, but still safeguarding the public in every way, with profits limited to ten per cent of its cost, all under the supervision of the Interstate Commerce Commission, and all declared constitutional by the Supreme Court of the United States. It will also be apparent that the existing charter will continue to be the most appropriate and best instrument for carrying out such a great interstate project.

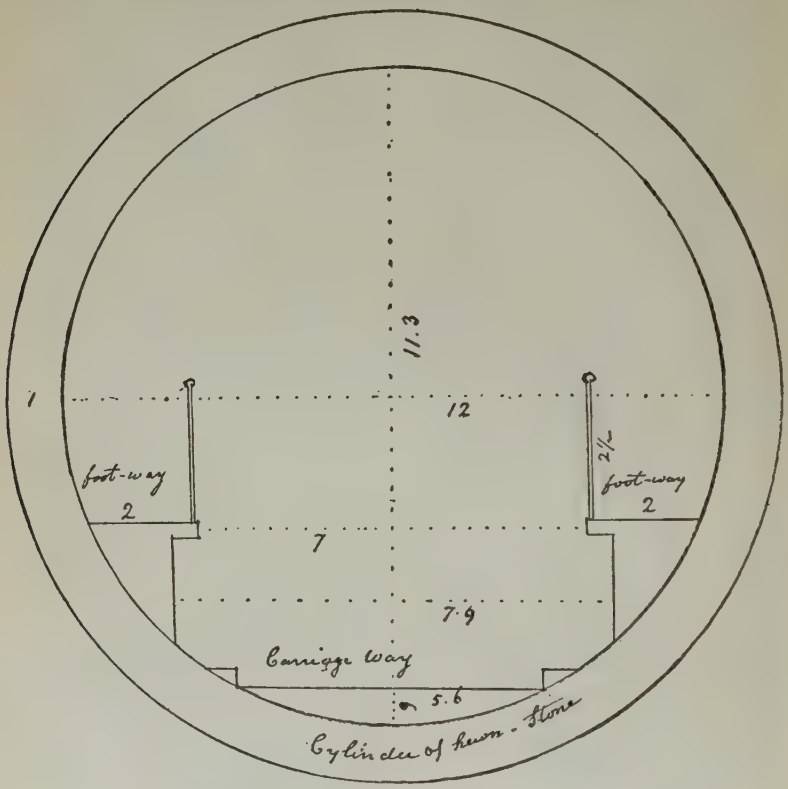
Without going into greater detail of the colonel's earnestly repeated arguments, it is evident that President Rea has paraphrased him after more than a century. Could the one man have lived later, and the other earlier, the present project upon the upper Hudson might long since have been completed and in service. Moreover, when the colonel's bridge ammunition missed its mark, and when he drew another shot from his locker, Mr. Rea would doubtless have helped load the new gun. In the congestion that the years must bring, New York and its vicinity would be helped by bridges and ferries, but a third link in the chain of communication must eventually be forged. Perhaps nothing in the colonel's life more clearly reflects the quality of his vision than his proposal of 1806—the laying of vehicular tunnels, not *under* but *in the beds of* the Hudson and East rivers.

Briefly, the plan was to build cylinders of timber, each in the form of the frustrum of a cone; to drive these cylinders together, build frames about them, line them with "brick or hewn stone," fill them with water, and sink them in the silt of the river-beds. When they had settled, they were to be pumped out and a roadway established through them. For the usual preliminary experiment the colonel proposed an eight-foot tunnel. This would be large enough "to permit carriages of all kinds, without tops, to pass

thro'." If it were successful, two fourteen-foot tunnels could follow, thus providing two-way traffic without interference, and the small tunnel could then be given over to foot-passengers. As was his habit, the colonel made an exhaustive estimate of the cost of the experimental building, at the same time running a line of soundings, at about three hundred foot intervals, from the "upper wharfe" at Hoboken to De Cline's on the New York side. The soundings ranged from three fathoms inshore to twelve in mid-stream, depths which he thought presented no insuperable difficulties. "We may," he said, "rest easy about any damage to be sustained by shipping of any draught of water passing over the tunnels." As to the character of the river-bed, he declared himself "warranted in presuming that it has been formed by alluvial deposits." With an "even, uniform surface, the curve of the sag, or festoon would deviate, in so long a distance, so little from a straight line that the effect upon the joints would be very slight." As to an interruption of river traffic while the work was in progress, this, in view of the ultimate gain, would be negligible.

No opposition to the idea, nor failure to coöperate with him in the stock company which he proposed to organize, could ever shake the colonel from his conviction that the tunnel must come. In 1810 he seized an occasion to bring the whole plan forward again. Having read an account of the difficulty in *digging a tunnel under the Thames*, he wrote to Mr. Wadeson, one of the British engineers, suggesting that "it would be practicable to carry a tunnel on the bed of the river from Tilbury to Gravesend, in such a manner that . . . it may form a regular curve." At the same time, repeating his arguments in America, he pointed out that British engineers were so far from being discouraged that they were proposing a tunnel under the Firth of Forth. Why

should Americans be afraid of an experiment? He would put his ferry and his steamboat patents into the capital of a tunnel company. "An appeal," he concluded, "is now



THE HUDSON TUNNEL AS COLONEL STEVENS DREW IT

made to the head and heart of every man in the community who feels an interest in the honor and welfare of his country and at the same time makes a just estimate of the emolument he will probably make." A guess at future gains could be based upon the fact that New York's population had "three-

that the wheel must have worked to much disadvantage
The proper angle of obliquity was not attended to, besides the
wings were made with a flat surface ~~[illegible]~~ whereas a cer-
-tain degree of curvature was necessary And in order to
give a due submersion to the wheel the axis was inclined
at least 30 or 40 Deg below the horizontal line The ma-
chinery too was put up in a very course manner —
One very important consideration in favor of these wheels
is the facility with which they can be defended from all
external injury, By placing them in the stern thus

My foreman promises me to have
the boat ~~ready for trial~~ the engine agoing in about two
weeks from this time - I shall em-
-brace the first opportunity of acquainting you
with the ~~result~~ of my experiments -

In your last you have bestowed on me a title an appellation
I am not entitled to, when you write again stile me Mr or, if
you please, Esqr.

I am Dr Sir
With esteem & regard
Yours &c

COLONEL STEVENS TO DOCTOR HARE
(*page 194*)

bled" during the last twenty years; even were there to be no gain, what was a "trifling pecuniary sacrifice for the attainment of an object so highly beneficial"?

The records do not show what, if any, subscriptions were made to try the colonel's experiment. They do show that the first real attempt to dig under the Hudson was begun in 1874, and that the Pennsylvania tunnel was started in 1903. One cannot but wonder whether the ears of the governor of New York and the governor of New Jersey, shaking hands a few months ago at the exact center of the Holland Tunnel, were attuned to hear the shade of John Stevens chuckle "I told you so!"

The impressions gathered by John Cox supported his father's belief that war with Britain was not only inevitable but actually upon us. To Selah Strong, chairman of the Corporation of New York, he put the case bluntly:

August 12, 1807

Our differences with Great Britain, resting as they do on points eminently calculated to rouse the sensibilities—to touch to the quick the interested feelings of both parties—I fear are not susceptible of amicable adjustment. The unbending pride and arrogance of her pretensions to maritime supremacy—the rancorous prejudice and unfriendly temper of the king and his present ministry toward us—hold out no encouragement to hopes and expectations of remaining long at peace with her. In short, if the dread of exciting commotions among the manufacturers does not restrain the temper of the ministry, war with England is inevitable.

The completely Jeffersonized navy was in no position to back up any such outburst. President Madison, had he been leaning over the colonel's shoulder when this letter was begun, would doubtless have reached down and rapped him over the knuckles for grave indiscretion. Yet it was more

than mere diatribe; its object was to precipitate a discussion of New York's defenses. That these, at the moment, amounted to very little, the colonel could see by a glance at the list of available guns, some mounted at convenient points, some not mounted at all. They could hardly be called impressive.

Belonging to New York State:

40 iron 32-pounders	2 brass 9-pounders
41 iron 24-pounders	10 brass 6-pounders

Loaned by the United States:

12 iron 24-pounders	10 9-inch Howitzers
5 brass 18-pounders	1 8-inch Howitzer.
8 brass 12-pounders	

It was a study of this meager battery and a talk with Colonel Jonathan Williams of the army, detailed to study the defenses, that definitely led to the letter to Strong. Continuing, Colonel Stevens expanded his ideas and offered a few suggestions:

> We all know in what manner war in that country is now usually declared. The first intimation we shall have . . . will be that our vessels are seized and plundered in every quarter of the globe. . . . Her cupidity and jealousy of our commercial prosperity will excite an ardent wish to lay this opulent city . . . under contribution or in ashes. Let us be prepared . . . to receive her naval armament in the best manner . . . time and circumstances will permit. Something must immediately be done that holds . . . a fair prospect of success in a *short time*. . . . I throw out the following plan:
>
> One or two miles below Bedloe's Island, let blocks be sunk, constructed in the usual manner for wharves, at a distance of 50 or 60 feet from each other. These blocks to be 25 or 30 feet square, or longer if thought necessary, and armed with che-

vaux-de-frises. Beginning in the centre of the channel between Mud Flats and the flats between Robin's Reef and Bedloe's Island, form two lines of blocks, nearly at right angles, in a northeasterly and northwesterly direction, extending each 400 yards, making a base of 500 yards. Leaving intervals of 200 yards, two other lines—southeasterly and southwesterly—extending to the flats on each side. . . . The blocks approaching the middle of the channel must rise only to 18 or 20 feet from the surface at high water; all the rest, 6 or 8 feet above the surface . . . to serve as a shelter for gunboats stationed behind them. . . .

As a temporary expedient . . . a line of frames—or rafts —must be moored across the opening between the lines of blocks. . . . The greatest use of these rafts will be to prevent ships of war . . . passing through the intervals . . . and to protect . . . floating batteries of 500 feet each, from being annoyed by fire-ships. These batteries must carry at least four tier of heavy guns . . . to sweep the area between the blocks. . . .

The more I reflect on this all-important business of defence . . . the more firm is my conviction that *land-batteries,* however constructed or placed, afford no security against a fleet. . . . The ships can pass with little or no injury. . . . The floating batteries will carry, in a space of 100 yards, one hundred and twenty guns. . . . Only one ship of the line can lay her side—say forty guns—against one of the batteries. . . . When aided by upwards of 50 gunboats . . . with fireships in readiness and, above all, a line of Mr Fulton's torpedoes [mines] surely the batteries would remain impregnable?

To give a more complete idea, my plan will be exhibited at the Tontine Coffee House. One collateral advantage occurs to me: To carry this into effect would require no further cession of territory from this state to the United States. I invite criticism, if made with candour and decency, from honest and disinterested motives.

As the colonel had hoped, considerable discussion resulted. In response to a broadcast notice to the effect that "however unhappily we may be divided in respect to local poli-

tics, we are, thank God, on the present occasion unanimous," brought quite a gathering to the coffee house. With his pockets crammed with plans and sketches, the colonel arrived early and stayed late. A dozen ideas were brought forward, among them that of Jonathan Williams, who favored the Narrows for the defense. To this the colonel objected that the bar "extending from the point of the Hook toward Long Island" might be dangerously increased by the changes in the flow of current due to permanent obstructions in the Narrows. Also, since the time to build the Williams plan would take two years, would not his own floating batteries prove quicker and cheaper?

The committee that was appointed does not appear to have made much headway, even though $100,000 to defend New York was appropriated by Congress. The colonel spoke of the committee's report as being concluded "in terms of utter despondency and despair." Actually, the report did say that "if we should unfortunately be involved in war, it will most probably take place before any effectual means of defense can be completed, and we must submit to our unhappy situation." Certainly this was not a very militant attitude, but one not at all unusual at that period. On the colonel's own part, the whole effort represented a mere branch of his regular activities, its chief significance being the effect it had of convincing him of the vital importance of mobility and of leading him to consider the designing of more fully protected ships of war. In addition to offering to construct, at cost, the batteries he had recommended, he addressed the Jersey representatives in Congress upon a kindred subject:

Dec. 3rd, 1807

I find that it is contemplated to build an additional number of gunboats for the defence of our harbours. . . . Permit

me, Gent'n, to suggest the propriety of apportioning these, provided the business can be consolidated with equal advantage to the public interest, among the several Atlantic States according to their propinquity to the places these boats are to be stationed. . . . In conformity . . . I take the liberty of recommending the Ship Yard I have at Hoboken. . . .

The wharf in front commands a sufficient depth of water and is at all times occupiable even in the severest weather. . . . A blacksmith's forge, a brass foundry, saw-pits, &c, are erected on the spot. There is . . . in the yard a quantity of the best white-oak timber, cut in my own wood in the vicinity, which is capable of furnishing timber of the best quality for building, both oak and cedar, for ten or a dozen of these gunboats. In addition, Mr John Morgan, an eminent shipbuilder . . . has constructed during the last summer a machine for taking vessels of any burthen entirely out of the water . . . for graving, cleaning, repairing, coppering, &c. . . .

As, in all probability, no application . . . from any other place . . . in New Jersey will come forward, I flatter myself that you will feel some interest.

In the same strain the colonel wrote to the secretary of the navy, emphasizing the quality of his timber and pledging himself, as "a Native Born American Citizen," to build six or eight gunboats as cheaply and efficiently as this could be done anywhere in the United States. In the general scramble of unpreparedness for 1812 it appears that he got no chance to prove what he said, but here again his interest received a definite impulse toward the study of warships and their characteristics. The impulse never left him, and he was later on to yield to it again. At the moment, disappointed by the Government, he turned back to those more purely commercial enterprises in steamboating which had been engaging him for years.

CHAPTER ELEVEN

The first wholly American-built steamboat of importance, definitely engaged in the commercial transportation of passengers and freight, was named the *Phoenix*, designed, built, and operated by John Stevens. His plans for her, as the largest craft he had yet attempted, began taking shape in the summer of 1806, when she appeared to be justified by the performance of his forty-foot steam ferryboat—three and one half miles an hour. While debating her exact design with his sons, he ordered the lumber cut and stored.

As to machinery, he believed much could still be gained in reducing space and weight. For more power, he increased the "cylinders" in his multitubular boiler from twelve to nineteen; trying this in the twenty-nine-foot boat of 1807, he got six miles an hour. However, satisfied that he could not carry enough pressure of steam for propellers, he concluded to revert to Roosevelt's paddle-wheels of ten years before. Propellers must wait for still better boilers.

Writing of the new twenty-nine-footer to Livingston, at Christmas-time, the colonel declared himself to be "upon the whole, perfectly satisfied with the experiments," but determined to make the boiler tubes "four inches diameter instead of two," to give "a greater head and surface of steam and water." The larger boat, which he now expected to lay down early in the next year, was to be one hundred feet long and twenty-six feet wide, finished and ready to operate in May. Meantime, he asked, was there no way in which Livingston and Fulton would combine with him,

in order that all might have the benefit of the improvements which each had already made or might hit upon in the future? He "ardently desired to avoid collision"; could they not "contribute mutually toward bringing to perfection one of the greatest works for the benefit of mankind that had ever yet been effected"? Jointly, they might "set all competitors at defiance," whereas by proceeding separately they would probably "throw open the door to contending interlopers." Further, should his new boat prove faster than theirs, would their New York grant hold good? Suppose he obtained a license from Perth Amboy and ran his craft, as a coasting vessel, up to Albany with live-stock? Suppose, against the four miles they were prepared to guarantee, she should make even no more than six miles an hour? He saw no reason for her not making ten, but even at six would not the odds be too great for the *Clermont?* Would any action brought in Jersey courts avail to restrain him? Why should Jersey respect an act of New York's, "passed in contravention of the Spirit and Letter of the Federal Constitution"? If he could not make more speed than the *Clermont* he would not feel "at liberty, upon liberal principles," to contest their exclusive rights on the Hudson, but he was confident of beating them. He begged them to reconsider, because it was his "sincere wish to unite upon equitable principles."

Six months before the colonel wrote this letter the Hudson River monopoly had seized that new-born Hercules, American steamboating, by the throat and very nearly strangled it. Intentionally or not, the monopoly was well designed to cut the young enterprise off from the breath of its life—open competition. Perhaps the viciousness of this "restraint of trade" was not appreciated by those who originated it; yet, had it been entirely successful, progress would

have had a fatal blow. Fortunately, the cradle was not without its guardians, whose motives, although undeniably colored by selfish interest, must to-day appear commendable. While this struggle between the monopolists and the independents was actually in progress, with successive events fresh in men's minds, it was everywhere discussed, with pros and cons fiercely fought. Frequently a court decision one way or the other was a question of bread and butter; invariably it was a question touching men's pockets. Since it has been fading into the long past, the history of the struggle has occasionally been considered from one point of view or another, but not from all of them. In the papers of Colonel Stevens, chief target of the monopolists and most often hit, are many letters dealing with matters never placed in their true light.

The colonel, nearing his sixtieth year, had had his share of disappointments and of successes. Both because of his rather more advantageous position in the community and because of what he had actually accomplished in building and operating steamboats, he was the American leader of the engineering profession. In 1806, further success along the same line loomed so close that he could see much to lose by any interference with his plans. The Hudson, running past the foot of his lawn, was the obvious water of which he had already made great use and upon which he relied for more experiments. Albany, a hundred and sixty miles away, had been his goal ever since his earliest efforts with Roosevelt and Livingston. He was ready and eager to progress up the Hudson.

Chancellor Livingston, as a party to the three-cornered agreement, had made a twenty-year promise to share the colonel's efforts. During several years in France the chancellor had not wholly lost touch with steamboat events in

America; to some extent, at least, he must have known of the screw propeller and of the colonel's intention to build larger craft equipped either in this way or in some other—to say nothing of the intimate family connection between the two. On the other hand, the success of the experiments of 1802, on the Seine, had made Livingston confident that much could be done with the British engine as Fulton proposed to modify it on bringing it to New York. Indeed, Livingston had long before contemplated importing such an engine on his own account. Also, he was convinced that Fulton was working along the proper theory of hull resistance and pressure. Apart from any question of invention, he believed that Fulton would produce a good combination.

Hence, the chancellor's position between Stevens and Fulton was a difficult one. It was easier for him to use his influence in securing the monopoly grant from New York than to extricate himself by a compromise which would be satisfactory to all concerned. Professor James Renwick, writing in Sparks's "Biographies," declares that "it is probable that, had Fulton himself been the sole proprietor of the grant, . . . a spirit of compromise would have governed him." On the contrary, the facts indicate the opposite probability. Livingston wanted to compromise—not Fulton.

This was because Fulton's position was by far the least complicated of the three. After his French experiments he became satisfied that a Boulton & Watt engine, modified as he proposed, would drive a steamboat. In view of the strict English laws against exportation, Fulton had every reason to feel proud of succeeding in bringing one to America. His earlier successes with the submarine and the floating mine gave him confidence in his own mechanical ability, and this, with the backing of the Livingston influence and the generously opened Livingston purse, he was anxious to employ

to the fullest. It was not in the least unnatural that Fulton should have been jealous of any interference with his high prospects, more especially since he was a younger man and very impetuous.

Such was the situation of the three men who became the central figures in the long fight. Between its beginning and the distant day when Chief Justice Marshall, using the Ogden-Gibbons suit as case in point, should definitely settle the issue, many other men entered the struggle either as advisers or as active partners on one side or the other. Yet these later-comers are less important and may be considered as they appear.

The date upon which the monopoly became effective may be accepted as that upon which the *Clermont* ran her first trip—July 18, 1807. Oddly enough, the event which led by tortuous courses to establishing the steamboat as a *commercial* fact in America created hardly more sensation than had the earlier events which made it a *mechanical* fact. It might be expected that those paddle-wheels, churning the river in plain sight of all New York, would have stirred up at least as much excitement as animated Professor Renwick's crowd, hurrying toward the Battery three years before, to see the *Little Juliana* cross the Hudson without "visible means of propulsion." Yet the most exhaustive search of contemporary newspapers and periodicals will hardly repay the effort with anything adequate to the occasion; indeed, such a search will do little more than prove that an improved mousetrap, to-day, would get ten times the publicity. The obvious explanation lies in the fact that no more than a score of Americans knew what a steam-engine was, while perhaps half a dozen had any idea of its immeasurable future. Fulton, in raising funds for the *Cler-*

mont, went through the experience that had been the colonel's.

Before the *Clermont* was launched, there had been considerable discussion between the three men chiefly interested in her building. In that long and rather bitter letter that he wrote on April 2, 1813, to his adoring satellite, Cadwalader Colden, Fulton told something of these discussions and his view of them:

> In the winter of 1806-07, my partner, Mr Livingston, proposed to Mr Stevens to be a partner with us, to the amount of one-third of every advantage which might accrue from our United States patent and state grants, on condition he would pay one third of five thousand dollars, the expenses of our experiments, just paying 1666 dollars. He declined this offer.

Here was the first of the chancellor's several efforts at compromise. Colonel Stevens, when he replied, through Colden, to this statement of Fulton's, had this to say of the motives for the offer:

> They were unquestionably these—that, previously to Chancellor Livingston's departure for France, he obtained from the Legislature of the State of New York an exclusive grant for running steamboats on the waters thereof; that, by an agreement now in my possession, a partnership was entered into between Chancellor Livingston, Mr N. Roosevelt, and myself, respecting said grant, on condition of my paying one-third of the expenses incurred in building a Boat, etc; the full amount of which third was duly paid by me. It was not, therefore, from motives of generosity that this offer was made me, but from a sense of equity and justice.

True. Equally true that, had the earlier grant come into effective operation, the colonel would himself have been a party to virtual monopoly. Since, "during the winter of

1806," he was to be thrust out into the cold unless he accepted Livingston's offer, he would have saved much worry and a great sum of money if he had then and there put his pride into his pocket and taken his wallet out of it. Instead, he acted upon what he consistently held to be good reasons for refusing the offer. He had already spent more in American experiments than Fulton and Livingston had spent in French ones; he was by no means convinced that Fulton's combination would *eventually* prove to be the best one—as, in fact, it did not. Already having several United States patents and proposing to take out more, he felt—as a virtual originator of the patent laws—that Fulton was as likely to infringe upon him as he was to infringe upon Fulton. Finally, rather than accept second place at the outset, he wanted to try out his own machinery. For all these reasons he signed an independent contract:

Articles of Agreement, made . . . this seventh day of January, one thousand eight hundred and eight, between John Stevens . . . and Nathan Sayre, William Gailer, Joseph Morgan, and William Williams. . . .

That, whereas . . . John Stevens, Esq has engaged the parties to build a boat of the following dimensions: One hundred feet keel, sixteen feet beam molded, & six feet four inches from the floor to the lower part of the deck beams, the said parties agree to build the boat for NINE HUNDRED DOLLARS . . . John Stevens finding all the materials.

That is . . . the said parties . . . engage to do . . . all the carpenter's work, caulking and delivering the . . . boat, afloat in the water in a good and workmanlike manner, exclusive of Joiner's and Carver's work, on or before the FIRST DAY OF APRIL ensuing . . . on condition of John Stevens making . . . the following payments:

One hundred dollars when the keel is laid and the stem and sternpost raised; one hundred and fifty . . . when the boat is in frame; one hundred and fifty . . . when the boat is planked;

two hundred . . . when the deck is laid; and the remaining three hundred when the boat is launched and finished. . . . The said boat . . . to be built under the superintendence of John Floyd, shipwright of Hoboken . . . from whom the parties are to receive and obey all instructions. . . . It is further agreed . . . John Stevens . . . will deliver . . . at the place of building . . . all materials necessary . . . so that no delay may take place. . . .

For the faithful performance . . . the parties bind themselves, etc . . . in the Penalty of Five Hundred Dollars . . . to be paid by the party failing. . . .

Nath. Sayre
Joseph Morgan
Wm. Gailer
William Williams
John Stevens

In presence of
Robert Cocks, Jr
Henry Stoutenburgh

Hardly had the signatures been sprinkled with sand before the colonel received from Livingston and Fulton a reply to the proposals sent them in December. If he had been skeptical of the *Clermont*, Fulton was even more so of the Stevens boat, and in what the partners wrote this was the sentiment expressed. In the main, however, their letter was a long analysis of the Constitution, written in the chancellor's hand but purporting to be a joint interpretation. In conjunction with the rejoinder, made in two parts by the colonel, this letter offers a presentation of the whole case too exact to be omitted. Unfortunately, the "staple of argument" in the Livingston-Fulton letter is sometimes drawn very fine indeed; to read the whole effusion, and then attempt to read the colonel's replies, is to become hopelessly lost. It seems possible to present a summary only as a sort of debate—which was, in fact, the method followed by the

colonel in attacking paragraph by paragraph. He did not get this long letter until a week after it was actually written, Livingston having finally forwarded it with this note:

I sincerely hope the proposition we have made you may be agreeable. . . . I am satisfied it is more advantageous than the one you propose. . . . Still, I think if you should upon a fair trial succeed so as to run a mile or two faster than we do, that we might make a better plan. . . .

Mr Fulton was to have been here today. He not coming, I send you our letter without his signature.

The chancellor was hedging a little, to leave openings for a compromise. But the main letter was less hopeful:

Clermont, 13th January, 1808

We have consulted together and fully considered your application to become interested with us in our patent rights. We are sorry to find you adress yourself . . . to our fear of not being able to support our pretensions ag't *any new patent*. Upon this subject be assured we do not feel the slightest apprehension. . . . If we did, it would be madness in us to proceed. . . .

A long boat, and wheels was, with us . . . the result of expensive and numerous experiments. . . . Neither of these entered into your plans . . . nor did you, after we had told you of our intentions to use them, manifest any faith. . . . You constantly refused to come into partnership with us . . . because you believed our propelling apparatus was defective. . . . Is it right to threaten to fight us with our own weapons?

Considering how large a field the U. S. opens, we had hoped you would have left us the quiet possession of that we had pre-occupied. . . . This we flatter ourselves you will be inclined to do, when we first convince you that we have an undisputed right to navigate with steamboats all waters belonging to this state, and conclude, out of mere friendship, by abandoning to you such a portion of our rights as will be more advantageous to you than the partnership you propose,

because . . . not subject to . . . your method being better than ours.

It is to be noted that there was no reference to the conditions attached to the original offer of partnership, made "from the most friendly motives." However, the colonel disregarded this omission in his hurry to get at the real issue, by answering this opening as follows:

It is not true that the waters of the state of New York have been preoccupied by the gentlemen. I have made various experiments thereon, long before they commenced operations. I have had steam boats on the Hudson River during every season for five or six years. . . .

Why, then, have Livingston and Fulton got . . . the start of me? My object has been to improve upon it [the Boulton & Watt engine]. . . . The arrangement . . . of the parts of the machinery . . . has undergone alterations, to render the whole . . . more simple and more conveniently adapted to the object in view. . . . Above all is the improvement in the boiler . . . not merely reduced from 18 or 20 to 7 or 8 feet, but . . . capable of withstanding a great pressure.

If the first point in the Livingston-Fulton letter aroused the colonel, he was to be really irritated by the chancellor's next words:

This State has vested in us exclusively the right to construct, use, etc, all vessels moved by steam . . . in all the creeks, rivers, bays . . . whatsoever, belonging thereto. . . . It enacts further that, if any person . . . shall infringe our right, such person shall, for every such offense, pay to us one hundred pounds and forfeit the boat & engine with her furniture; and gives any court within the state jurisdiction. You will admit that this right is full and clear &, *unless it is done away by something in the constitution of the U. S.*, that it is incontrovertible. . . . The U. S. have no rights but those derived from the States.

Readily admitting this to be a plain statement, the colonel snatched up his quill to attack the soundness of it.

It is never to be admitted that the state could . . . grant to any person . . . the whole river . . . particularly in the sense the Gentlemen mean—an exclusive right to navigate the same. Such a claim on the part of the State would be too absurd to receive serious consideration.

[As to the rights of the United States] this, I conceive is not correct. The Constitution was the work of a convention assembled for this express purpose, by the People. The Preamble reads "We, the People" . . .

Taking up the Livingston-Fulton letter again, the colonel was astonished to find that the chancellor had next written:

U. S. rights must be strictly confined to the express words of the constitution. All that is found therein . . . is . . . "To promote the progress of science and the useful arts, by securing for a limited time to authors and inventors the exclusive rights to their writings and inventions." . . . The word *securing* shows no new right is given . . . but a natural right . . . confirmed ag't those who attempt to pirate it. . . . Congress is only empowered to turn that into exclusive property which would otherwise have been common to everybody. This is more evident by their using *right* instead of *benefit*, which might have had a more extensive sense. . . . All property must be held subject to the laws of the community.

Knowing all he did about Patent Law, it may be imagined that he chuckled sardonically as he read on:

I have a property in a cart with narrow wheels. Surely the State may say that none but *broad* wheels may travel their roads, even tho' my cart have patent wheels. . . . My right in the cart is not taken away, tho' its value be lessened. . . . A Patent only places an invention upon the same ground as

A COACH AT THE DOOR OF NUMBER SEVEN BROADWAY

other property, without diminishing the control every state has over the use of all property within their jurisdiction. . . . The most mischievous consequences would result from a contrary doctrine.

A cart with narrow wheels was a figure taken from the colonel's pet subject—transportation. Almost literally, he leaped upon the cart.

There is [he protested] no prohibition of the use of wheels *because* they are patented but of *narrow* wheels *because they are injurious to the roads.* . . . If the use of broad wheels is advantageous to the public, the patentee as well as others must submit. . . . The only question, here, is whether a state can prohibit *all* travelling on her roads, unless with wheels of a certain width. . . . The interest of the patentee would be affected . . . like any other.

This point covered, the colonel considered the next one:

Suppose [suggested Livingston] Connecticut so fully peopled as with difficulty to support labouring classes by the manufacture of linnens & woolen cloth. Suppose a patent granted for a labour-saving machine by which one man might . . . do the work of 500. . . . Virginia might encourage it as a useful invention, and Connecticut prohibit it as injurious.

Not at all [retorted the Colonel]. I do not conceive that a state prohibition would be valid. Should the exercise of a patent prove injurious to a . . . part of the community, they are bound to submit for the general good. If this were not the case, there would be an end to all general legislation, as few laws bear equally upon all citizens.

Livingston, however, had had more to say along this line:

Authors have a right to their books. Yet, if one were to write against the Constitution, shall not the government prohibit publication? This state gives to a particular class of citizens

the right to vend medicines; shall a mountebank vend his drugs in the face of the law, and poison ad libitum, because he sells patent medicines?

You have observed, Sir, in reading over the Constitution, that, where there is no prohibitory clause, the States & Congress have a concurrent jurisdiction in such matters as are vested, but not exclusively vested, in Congress. . . . The right to grant patents is *not* among those which the States are prohibited from exercising, tho' Congress also enjoys it and will almost exclusively exercise it.

Laughing at what, to him, was mere circumlocution, the colonel cited some law of his own choosing:

With respect to the book, surely the courts of justice might be relied upon to prohibit publication and also inflict condign punishment upon the author. In the case of patent medicines, the state law must be levelled against all . . . or one. A general prohibition would be a manifest infringement of the Constitution because many medicines are confessedly good. If against a particular case, the state legislature would assume a power . . . on a subject they were totally ignorant of; the medicine in question may be esteemed a poison by some, a panacea by others. . . .

The 7th Section of the Patent Law strongly implies that no state . . . after adoption of the Constitution, could grant exclusive rights for inventions. . . . Or, at least, that a patent for . . . right under a state could have no efficacy against a patent under the United States. . . . How does your extraordinary doctrine comport with the express power given Congress to "regulate commerce with foreign nations and among the several states"? The powers . . . vested in Congress by the 8th Section of the Constitution [are] all of such a nature as to exclude . . . concurrent jurisdiction remaining in the states individually. The 12th Article of the Amendments seems to put this . . . beyond all doubt. It declares . . . "The powers not delegated to the U. S. by the Constitution, nor prohibited to it by the States, are reserved to the states respectively, or to the People." What are we to understand from this, but

that the powers delegated to the U. S. by the Constitution ARE exclusively vested—NOT reserved to the States? True, it may be said that the states individually have a concurrent jurisdiction with the U. S. in . . . laying and collecting taxes. But the object and purposes are totally different. . . . One is confined to "payment of the debts and providing for the common defense and general welfare of the U. S."—the other, solely for municipal purposes within the jurisdiction of each particular state.

If we go through . . . the powers vested in Congress, we shall find them all of this description; none . . . requiring a concurrent power to be vested in states individually. Such a power would be . . . productive of the greatest confusion. Amidst jarring and conflicting jurisdiction, no man could place any confidence in his patent rights. . . .

My patent for a boiler was granted four years before the Act granting exclusive [state] right. . . . Long before the Chan'r & Mr Fulton came to this country, this boiler was in use on the waters of New York. I was not only possessed of the *patent* right but in the actual exercise of that right, before the passing of the above Act. . . . And, should it be contended that the [last] Act was intended to continue the right which Robt R. Livingston had . . . by the Act of 1798, I should . . . have a clear title to one-third of the right . . . as a partnership then actually subsisted between Livingston . . . Roosevelt, and myself.

This last was letting the Livingstonian cat out of the bag with a vengeance. Plainly, the colonel recognized that the old agreement was a constant strain upon the chancellor's conscience. Hence he was not astonished to find Livingston, in his next argument, taking a different slant.

You will observe [said Livingston] that our grant is not in the nature of a patent . . . but a contract. We bind ourselves to do something which the state considers useful. . . . They give us an exclusive privilege upon precisely the same grounds with a turnpike or bridge company . . . in [which]

you may see an instance of concurring jurisdictions. Congress have the power to regulate post-roads. The state exercises the same right . . . nor could Congress infringe upon the charter. The states may erect toll-bridges—witness those of New York and New Jersey. . . . Suppose a man have a patent for forming rafts such as cannot pass the draws? Shall the proprietors be compelled to pull down the bridge or widen the archways, that he may have the benefit of his invention?

Fresh from an experience with turnpikes and bridges, the colonel felt qualified to discuss the laws governing them. First, however, he had to make a retort on the question of contracts:

The gentlemen appear to be apprehensive. They contend that their grant is a contract. . . . But it wants the indispensable property of a contract—*reciprocity of engagements.* They are given two years to show their proofs, *but this they are left at liberty to do or not to do.* . . .

Congress are vested merely with the power "to establish post-roads," *not* with power of granting charters. These are never granted on the score of *invention*—it is *public utility* which alone can justify legislative interference. . . . [They] never interfere with the power given to Congress to secure to authors and inventors an exclusive right. . . . Grants for turnpikes usually specify the manner in which the road shall be formed, which precludes . . . a new invention. Bridge companies are in no sense vested with a general exclusive right . . . but merely to erect a bridge over a particular place. . . . Tho' there might be twenty patents . . . not one of the patentees would have the right to impose his bridge upon a company. They are merely restricted from using *his* bridge without his permission.

All this seemed clear enough to the colonel, but Livingston, in rushing headlong upon his destruction, had chosen to cloud the real issue with more discussion of state-rights.

The states [he wrote] stop navigable rivers altogether. . . . It is usual in every state to grant the rights of ferriage. . . . What possible difference can be between the right of navigating a river lengthwise and crosswise?

To the colonel this argument seemed irrelevant.

Were it not for the monopoly [he replied] there might be 500 steamboats navigating occasionally upon the waters of this state. . . . Who will pretend to say to what extent improvements may be carried? Shall all these patentees be precluded from the use of them, not by operation of laws which public good requires, but by a direct state prohibition? . . .

There is a material distinction made in the Constitution between navigating a river lengthwise and crosswise. In one case, it is totally silent; in the other, it declares that Congress has the power "to regulate commerce" . . . among the several states. . . . States individually are prohibited from "laying any imposts"—nor "shall vessels bound to or from one state be obliged to enter, clear, or pay duties in another." Will anyone pretend to maintain . . . that a state can grant exclusive privileges to any man . . . for transporting goods to and from her navigable waters? How does this . . . . comport with the power *given to Congress* to regulate commerce? . . .

Exactly so. But this was the doctrine which for many years would stunt the growth, through healthy competition, of Hudson River steamboating. In an attempt to smother the colonel with piled-up instances—chosen to fit his argument—Livingston still clung to this doctrine in his next paragraph:

The states exercise power in all their ports. . . . They might, if they pleased, forbid vessels of their neighboring states to enter their harbours altogether. . . . Do they not make and enforce quarantine laws? Do they not compel ships to submit to the inspection of a physician; to take pilots though they may not need such services? Have not a certain number

of men the exclusive right to keep pilot-boats? Could any patent take this privilege away?

Here was thoroughly confounded confusion. Into one scrambled heap the chancellor had tossed what we commonly know as the public health service, the inland rules for navigation, and so on. The charitable view is that there were then many complications in interstate trade and many differences of opinion. This was not, however, the view taken by the colonel in reply.

> These incidents [he protested] have no bearing. . . . Should a state see fit—tho' I by no means admit her Constitutional right to do so—to block up her harbours . . . a patentee would, in common with others, be precluded from the advantage . . . of her navigable waters. . . .
>
> The answer to all this is clear and precise. . . . If a patentee is prevented from enjoying . . . the benefit of his patent . . . in consequence of the *legitimate* exercise of the power of a state, he is . . . in common with every citizen . . . bound to submit.

That anything so obvious should have escaped the chancellor is curious, yet it may have been due to his being so intent, just then, upon sounding the note of patronage in the continuation of his letter:

> What has probably led you into error is having read the patent law without reference to the Constitution [!]. No law can be valid which goes beyond the power that framed it. . . . The first clause of that law shows that it was . . . to give an exclusive property such as a man may have in his house or money. . . . The next gives him the right to use his invention —merely surplusage, since every man may use his property, provided he does not interfere with the rights of others [!]. Had it [the law] ever gone further, and extended the right to every state, the clause would have been void for want of

power of Congress . . . or so explained by the courts as to apply only to cases that do not contradict other laws.

This, in the colonel's opinion, called for no more than a brief comment:

This is straining hard to get rid of a positive provision of the Constitution. The right to use a patent must *of necessity be extended to every state* . . . or it can be exercised in none. Nor can any court pretend to control or limit the universality of this right.

By this time, the Livingston-Fulton letter was fast becoming a treatise. Determined to convince the colonel once for all, they spared no pains to find an illustration which they felt sure would strike home. They were confident that they had put one such into their next paragraph:

Suppose a man to patent a new musical instrument. Would this give him the right to play in your garden and set your children a-dancing when you wished them to study? No. Your garden is your own . . . no man shall use it in a way you disapprove. You would doubtless alledge you had a right to choose your own fiddlers and . . . give them an exclusive right . . . to your garden. But whence have you derived this right? Is it not from the state? If the liberty to *use*, in law, means an unlimited use, a man may exercise it on your grounds. If it is limited, then . . . the right of property in a state, in its lands and waters, must be limited by *their* will.

At this point the colonel must have sat back and chuckled again. Not only had he had something to do with dancing, but—when it came to writing letters—he could go on quite as long as the next man.

Very sprightly and ingenious [he commented] but by no means analogous. My garden is my property exclusively. . . . I can prevent every other man from entering it. . . . This is

by no means the case with states. The People have thought fit to form a *general* government, to which they have delegated certain powers which they have declared shall be the supreme law of the land. . . . Among them is the very power in question [patents]. How idle to talk of state government in contradistinction to the supremacy of the general government.

Though this should have driven the chancellor out of the colonel's garden, he had not yet abandoned his position on the rights of States.

The rivers [he insisted] are not merely within the jurisdiction of the state but make a part of territorial rights. Would it not be very extraordinary if the state, which can give me the whole river if they chose, could not give me a privilege in it? Certainly nothing can be more reasonable than this construction of the constitution. Why should a man be entitled to a higher property in his invention than on any other of his acquirements? Any other construction would be creating a new species of property, unknown to any society, and would lead to the most mischievous consequences, enabling *an individual to control a government* [!].

It is curious that the colonel, at this point, did not suggest that the Hudson ran between *two* States, with the obvious inference that New Jersey might want something to say upon this question of "giving away the whole river." However, he contented himself with this dig at the chancellor:

I must confess that this reasoning is too subtle. . . . He contends that all property is derived from . . . the state. Where, then, is the difficulty of the general government's granting me a property in a thing over which it is confessed they have control? As to the bugbear about "a new species of property," this is arrant nonsense. Every patent is a creation of property which did not exist before.

The People have vested this power in the *general* govern-

ment. Yet he says that, if uncontrolled by the *state* governments, it will lead "to the most mischievous consequences."

The next point that Livingston had made was this one:

Take the very instance before us. The state, as the undertaking was expensive and hazardous . . . thought proper to encourage [us] by particular privileges. . . . Would it not be to the last degree unjust to rob the inventors of the rewards held out to them [!] merely because another person had later . . . found out another mode of doing the same thing? Surely the last comer would have no right to complain, if his invention is not taken from him but merely prohibited where it is not wanted, or where prior engagements interfere with it?

This argument having something of the nature of a boomerang, the colonel was quick to call attention to its course:

The Gentlemen bring the present case forward as an instance and indulge in a strain of declamation on the injustice of robbing *inventors*. . . . They now assume the characters of inventors . . . but what reason can they assign why they should be placed in a better position than other inventors? If "another person at a later date found out another mode of doing the same thing," why should he not enjoy the benefit? The object of the Patent Law is to "promote the progress of science." . . . It is contended that the undertaking was so . . . expensive . . . that no man could be induced to engage in it. This is not the fact. I have been engaged in similar pursuits and have expended more than they have—solely under a reliance upon my patent from the United States.

Because of this very reliance, the colonel felt justified in reading Livingston's further argument with amazement. The chancellor had written:

Your construction of the rights of a patentee would annihilate our turnpike and bridge companies. Pope [a leading

bridge-designer] might take down our bridges to erect his own, and the grant of a ferry would be no security against the patentee of a new boat. . . . In *our* construction . . . we are supported . . . by the official opinions of the ablest lawyers. Mr Jay has been Chief Justice of the United States, Mr Lewis of this state. As governors, they presided in "council in revision" and passed this law without objection. . . . They were bound by oath to pass on law contrary to the constitution. . . . Three times has the law passed our legislature, which always contained a number of able federal lawyers.

The facts as to passing the law are correct. Yet, as commentary upon the "able federal lawyers" of his day, the chancellor's statement is noteworthy. The colonel, for his part, was certain that equally qualified lawyers would agree with this view, although, in replying to this argument, he did not name them.

This line of reasoning [said he] is . . . a waste of mental powers in a quixotic tilting at windmills. No man in his senses would ever think of contending for such unlimited use of a patent as would give a patentee the right to infringe upon the private rights of his fellow-citizens or contravene the laws of his country. . . .

From such an exercise of state legislation . . . no patentee could have any security against ex post facto monopolies. As the use of his invention must be limited on the territory of a state, patents would become nugatory . . . serving only to ensnare the unhappy wight whose folly should lead him to place confidence in his rights. The salutary purpose of the Constitution and Patent Laws, to promote the progress of science, would be completely frustrated. . . .

It is not at all necessary to the well-being of a state that she should possess the power to prohibit a general patent. . . . The only plea . . . would be to prevent the pernicious effect of some particular patent. Even such a plea could never justify violation of the Constitution. . . . States, as well as individuals, upon . . . known principles of justice, are restrained

from the pursuit of their individual interests in derogation of superior authority. . . .

Monopolies are very justly held . . . odious . . . for it is the genius and tendency of monopolies to discourage and defeat, instead of encouraging, improvements. . . . But what hinders other states from granting similar monopolies? Should the navigating of vessels by steam come into general use . . . the monopolist in one state might set himself against the monopolist of another . . . and the . . . effect, contemplated by the Constitution, of free and uninterrupted intercourse between states would be jeopardized.

At this stage the colonel paused for several days, in order to study the remainder of the Livingston-Fulton letter. When he took this up where he had left it, the first paragraph not yet answered was this one:

We . . . flatter ourselves that our reasoning will be convincing to you. . . . Your beginning a boat without . . . any previous arrangement with us may induce others to believe that we have no right . . . or have become indifferent as to protection. If we encourage that idea, your example will be followed by others.

It has always been our wish to render our labours useful to you . . . of which you have the fullest proof . . . in the offer with which we shall conclude our letter; which we hope will be acceptable since . . . should your plan fail, you will be at liberty to use our experience. . . . Should your experiment succeed, which is at least a matter of doubt . . . our patent rights would insure the full benefit of it. Without it, you would be in danger of other projectors. . . .

High steam is no new invention; two cylinders are now used . . . and pipe boilers have long since been tried. *All, then,* that you could claim as original would be your mode of making them, which we acknowledge is ingenious [!]. We think it proper to proceed one step farther and . . . show that you cannot proceed on your present plan without a *manifest interference with our patent from the United States,* even if we had no State privilege.

Continuing, the letter gave some details of the claims made in the "patent of Livingston and Fulton," with their theory of construction, resistance, and engine power. Thereafter, the letter proceeded:

> You will readily admit that we are the first who have made an efficient steamboat. . . . Also the first who have specified in our patent that a steamboat can be made from it. . . . Here, then, is mental property which the patent law is made to secure. . . . Last winter, you denied the advantage of the long boat and wheels. . . . Your plan then was to use smoke-jack flies. Since the success of our boat, the importance of length and wheels are obvious, and it appears you must adopt them to secure success; *thereby encroaching on our patent.* . . .
>
> Wheels are not a new application. . . . A long boat is not new. This we acknowledge. Nor are the letters of the Alphabet. Yet an author, with 26 old letters, comprises a new book . . . and has his copyright secured by patent. . . . In like manner, we take known materials . . . produce a new effect . . . and patent the result of our labours. . . . Should a patent not secure such labours, no invention can be secure. . . .
>
> We think you will be convinced that you *cannot apply an engine to a boat . . . more than five times longer than she is wide. Nor can you use vertical wheels, nor move within our table of proportions and velocities which . . . is, in fact, the whole invention.*

However much they proposed to restrict his movements, the colonel felt that he could drive one of his steamboats through the holes in these arguments. It puzzled him to see how Livingston and Fulton, after their swing around the circle to what had been his own position from the first—the sanctity of patents—could consider the "26 old letters" available to them but not to him. He did not propose to infringe any patents they might have, but he could hardly sit silent before what he considered mere arrogance.

In my former letter [said he] I have refrained from animadversions on your boat. . . . But, when you tell me that "since the success of your boat the importance of wheels and length are obvious" and that I must adopt them—thereby encroaching upon your patent rights—you compel me . . . reluctantly to go into some investigation of the subject. . . .

You will not pretend to say that a boat 100 feet long would be an "encroachment"? No, say you, but her length must not exceed five times her breadth. Will you pretend to say that any patent will prevent me from using boats which have been in familiar use; to put my machinery, for instance, on board . . . a Durham boat or a Savannah boat because, forsooth, the lengths happen to be more than five times their breadth?

Before you can reasonably expect me to acquiesce . . . you must convince me that *no* boats now in common use are so constructed. . . . When the fact is notorious that there are at least 100 boats 100 feet long navigating the North River, you will not pretend that this discovery gives you any right to prohibit me from building . . . a boat 100 feet long? I contend that any attempt to restrict me to any determined breadth in proportion to length would be arbitrary and capricious, resting on no principle whatever. . . .

I proceed to the method of propelling the boat. . . As to vertical wheels . . . permit me to tell you plainly that I conceive myself at full liberty . . . to use them. *If you have made any special improvements, I am ignorant of them . . . and should by no means consider myself at liberty to use such improvements without your permission.* . . . As to the best application of power . . . I am by no means prepared to decide in favor of wheels. . . . Wheels are not essentially connected with the success of steamboats. Should you by your patent deprive me . . . of their use, it would only prove a means of enabling others to do without them.

Having added his regret that his "strictures" should have been called forth by the occasion, and having suggested that "it would not comport with propriety to communicate our

sentiments to others," the colonel paused to study the end of the Livingston-Fulton letter.

Having thus spoken of our right [they said] we are not disposed to abandon it. But—persuaded that friendship and reason may accommodate all parties . . . we submit a situation to your consideration:

As to the North River, we consider that we have the exclusive right . . . secured by the law of the state *and our general patent*. We have made our arrangements for navigating this river with two steamboats. . . . Our funds are ready. With our experiments in France, . . . our expenditures will be at least $30,000. . . . A second boat will cost $15,000. Should you succeed with high steam and our long boat, wheels, and proportions, and come in for a fifth-share . . . and should we gain $15,000 per annum, your share would be $3,000. . . .

To avoid all contention, would it not be better for you to take the line from New York to New Brunswick and from Trenton to Philadelphia? We will grant you our whole invention for that line of communication. . . . In this granting you may benefit by our invention from New York to Philadelphia to secure you against all risque. . . . It is to be understood and agreed to that, after you have tried high steam, should you find that you must work as low as 12 pds to the round-inch of the safety-valve; or that, to run as fast as we do, you do not economize fuel; or that, abandoning skulls, paddles, or smoke-jack flies, you must adopt our leading principles and move within our tables. . . . You will give a written acknowledgement that your boat is worked by our permission under our patent right.

There, at long last, stood the Livingston-Fulton offer. Obviously, stripped of its show of friendly anxiety, what it meant was "Take your boats out of your front-yard, the Hudson River, so that we can fill it with our boats. Establish yourself on the Delaware, at an inconvenient distance from Hoboken where you have located your building-ways

and your shops. Admit that we are inventors and that you are no such thing. These conditions being met, *we will protect you with our United States Patent.*"

It is incredible that the colonel should have been expected to accept such terms. In declining them, he wrote:

> My reasons for originally declining the concern, which it is acknowledged was offered in the most friendly manner, were the doubts I entertained from [the *Clermont's*] peculiar and slender construction. . . . It is with pleasure I say . . . she has exceeded my expectations. . . .
>
> I flattered myself I should be able to make great and important improvements & a short time, I hope, will prove my expectations were well founded.
>
> And now, Gentlemen, in respect to the overtures I have made you, of uniting our concerns by . . . some equitable arrangement, I confess myself not disappointed at not finding you *yet* prepared to accede to them. . . You have as little confidence in my success this season, as I had in yours, last season. So be it.
>
> I feel content that we should await the result of my experiment before we come to terms. As I have not the least doubt that both parties will ultimately find it to their interest to form a joint concern, I shall not attempt to . . . say anything in answer to your very masterly defense of your rights under the law of the state. But do not mistake me. It is only because I consider it unnecessary . . . and not because I feel myself unable to make a vigorous attack.

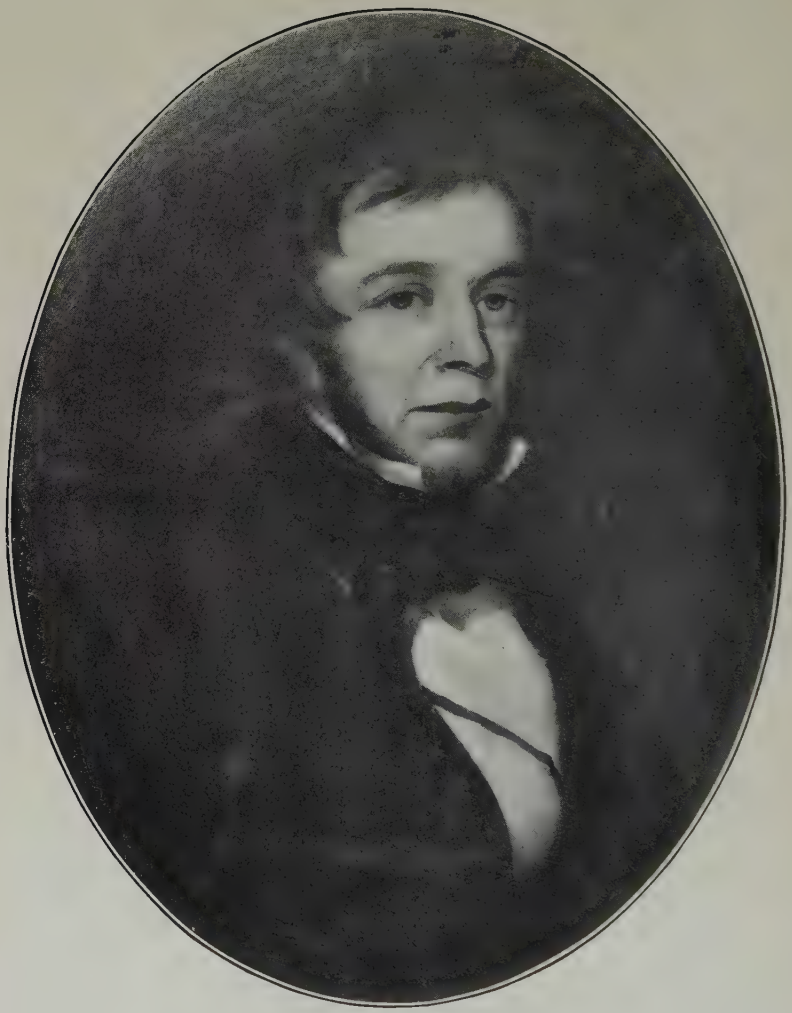
For the moment this ended the debate. Out of this discussion the colonel at least drew a good many ingredients for making "sauce for the gander." It is a disappointment not to know what he did call a really vigorous attack.

CHAPTER TWELVE

If the Livingston-Fulton letter represents what the chancellor made of this particular part of the Constitution, it would be interesting to know how he interpreted the rest of it. Since other statesmen and "framers" must have held equally unexpected opinions, it is easy to understand why the original quarrels over the document were hot enough to leave ashes that are still warm. For example, who would suppose that Fulton, in writing to the chancellor from Washington on July 12, 1809, would be able to quote James Madison in this way:

> Mr Madison called to see us yesterday. Dr Thornton was here. The conversation turned on our exclusive right to navigate with steam boats on the North River and the waters of the State of New York.
>
> Mr Madison is decidedly of our opinion—that the legislature of a State has a right to preclude any patentee from the exercise of his invention in their particular State, and to favor whom they please and for as long as they please. I think we should give it out, and strictly adhere to it, that we will not permit any vessel moved by steam to navigate the waters of the State of New York on any consideration whatsoever.

Such an attitude on Madison's part would naturally cause the chancellor and Fulton to accept his reputation in the country as strengthening their own position. In forwarding this letter for the colonel's information, Livingston reminded him that "the penalty is the forfeiture of the boat and engine and £100. Howsoever much I might be disposed



EDWIN AUGUSTUS STEVENS

to remit this," he added, "I doubt whether the same disposition would be found in Mr Fulton." There never was a more reasonable doubt.

With this solemn warning the brisk interchange of letters slackened, leaving the colonel well aware that, no matter what the final outcome, he would meet great and expensive difficulty in fighting against these New York State rights of Fulton's. Having nevertheless decided to proceed with his own new craft, her keel had been laid and the first payment of $100 recorded on January 20. Unfortunately, there is no record of the fine trees that fell at Castle Point under the clause binding the colonel to find and deliver all materials, nor has it been possible to trace out the joiners and carvers whose art was employed as the work progressed. Spread over that spring, however, the growth of frames and planking is marked by subsequent instalments until, on April 28, appeared the notation: "Bal. due discharged, $100." Three weeks earlier, the "Commercial Advertiser" of April 6 had carried this announcement:

> LAUNCH. Tomorrow, Saturday, afternoon at four o'clock, will be launched from the shipyards at Hoboken, a beautiful steamboat built by Mr John Floyd for Col. John Stevens. For model and workmanship, she is allowed by judges to be the superior of any in this country.
>
> Boats will be in readiness to convey passengers from the Hoboken Ferry, Number 76 Vesey Street.
>
> N. B. Should the weather be unfavourable, the Launch will be postponed until Monday, 10 o'clock A. M.

As the installation of her machinery proceeded, the colonel made another survey of his position—particularly in view of Madison's opinion as just quoted—and resolved again to test Fulton and Livingston in a letter dated July 23:

As my vessel and machinery are now nearly completed, I wish to know whether she will be permitted to navigate the Hudson River between the Cities of New York and Albany provided she accomplishes the journey in a shorter time than you can possibly do with your boat and machinery. Should you signify your permission, I shall have no objection to navigate under a license granted by you. Whereas, in case this permission is not obtained, she will, for the present at least, be cleared out from Perth Amboy, and passengers to and from the different landings between this place and Amboy will be taken in and landed at Hoboken.

Whatever may be your determination, you will no doubt see the expediency of, and will of course oblige me by returning, a speedy answer, as the boat and machinery are in such a state of forwardness as will enable me to ascertain her velocity in the course of a week at farthest.

Fulton being still in Washington, it was the chancellor who made the first somewhat caustic reply:

Clermont, July 26, 1808

I have this moment been favored by your . . . letter. I had hoped that you would have left our rights undisturbed and am sorry for your sake that you will not, since, if your boat should succeed (which I confess I greatly doubt) the world would have been wide enough for us both; and, as the waters of this State had been preoccupied, *first by Fitch and then by myself for years before you thought of a steam boat*, the world will judge of the justice or delicacy of your interference with us, particularly after our generous offer to you.

A few days later, after seeing the colonel's letter of the twenty-third, Fulton wrote Livingston that the Stevens boat must be more than "nearly completed" before her "working and velocity" could be ascertained. Admitting that she *might* run faster than the *Clermont*, he nevertheless declared that he had already attained the greatest speed possible with Watt's engine; "as demonstrated in my table of proportions,

it is 5½ miles an hour." Continuing by stating that he did not "pretend to greater velocities," he insisted that he was "the first who has shown the superiority of wheels to take the purchase on the water, and proved them by practice." After again accusing the colonel of copying his paddle-wheel idea, he asked what was the "object of a patent if not to secure such mental property"? He flatly refused to "admit that he [the colonel] has a right to use wheels for his purchase," and would "never admit that he has a right to use . . . a steam boat, whose length shall be more than 5 times her breadth . . . because I am the first to show the necessity of laying the weight in length upon the water. And I will never admit that he shall navigate the waters of the State of New York during the terms of years which the law of that State has secured to us." A clear statement like this completely disposes of Renwick's idea that Fulton might have compromised.

When this letter of Fulton's had been sent to him, the colonel felt bound to reply to it:

> My boat is now running. She has already travelled between two and three hundred miles and I have ascertained satisfactorily that the boiler will completely answer in practice the expectations I have anticipated in theory. The construction of the engine is also new and certainly a great improvement. For these, I shall take out a patent. . . .
>
> I have—not as the most advantageous but, upon the whole, as the most convenient—made use of wheels at her side. This, you contend, is an encroachment on your patent but I have not the most distant idea that this can be supported in a court of justice. Should you bring a suit and fail, this failure will prove fatal to you. Even should you be able to establish this claim, you will only compel me to resort to other means of applying the power, which will be more direct tho' perhaps not quite so convenient.
>
> Should you attempt to enforce the penalties of your state

law, the matter must finally be decided in the federal courts where, I conceive, you can have no chance of success. But should you, contrary to all reasonable expectation, even prevail there, surely a sister state would have an equal right to grant to any of her citizens similar privileges to the exclusion of all others. The consequence is obvious.

Plainly, the colonel was beginning to stir his sauce-for-the-gander. To show that he had some fresh ingredients for it, he offered the figures of his boat's performance. These had not been established, as they would be to-day, by runs back and forth over carefully measured miles that eliminated wind or current and made standardization of engines possible. The basis of calculation was the instant of passing a certain tree upon a well-defined bluff, or by bringing some particular church steeple abeam. But they were as accurate as other similar figures of the day and they were presented in a table:

Passed by the mouth of Elizabeth Town Creek		56 m.	after	2	o'clock
" "	Church on Staten Island	50 m.	"	3	"
" "	Bergen Point	50 m.	"	4	"
" "	Bedlow's Island ...	30 m.	"	5	"
" "	Pawles Hook	56 m.	"	5	"
	Hoboken	18 m.	"	6	"

Distance from Perth Amboy to Pawles Hook, 30 miles; time 5 hours 26 minutes, which is more than 5½ miles an hour.

Although gratified by a speed equal to that of any steamboat afloat, the colonel felt convinced he would soon reach better figures. Believing his new craft to be ready for service, he named her *Phoenix*—appropriately enough, since she had risen out of a fiery dispute with the monopolists. She had hardly been completed before her flight was hampered

by threats of suit and attachment from Fulton and Livingston, making it clear that to break the hold of these gentlemen upon the North River would involve the colonel in the spending of more money than he could readily afford while his Hoboken lots were not selling well. Confronted with the prospect of abandoning the Hudson, he spent some furious hours in striding about his lawn or in drafting letters that, in cooler moments, he either revised or never forwarded.

His relations with the chancellor at this period were an odd mixture of personal affection and professional animosity, neither element being strong enough completely to absorb the other. Thus, almost immediately after abusing the colonel for "interference," the chancellor might write in the most friendly way upon some such question as James Alexander Stevens's address as salutatorian at Columbia. Consulted as great authority upon such matters, the chancellor proposed that James take as his subject "The Progress of a Young Man on Entering the World," because this would "admit of much pathos and variety, enabling James to pay the expected compliments to old and young without stepping much out of his way." Upon a similar basis, the chancellor and John Cox had been partners, during the previous winter, in building an ice-boat at Clermont which "went at a great rate—16 or 18 miles an hour—though they have not yet brought her to lie close to the wind." Yet, each time the steamboat question arose, the chancellor would be neither helpful nor encouraging. As part of an argument to dissuade the colonel from proceeding, he spoke of the second boat he and Fulton were planning to put upon the Hudson, declaring that, while she would be "one of the most commodious in the world," the cost of "rebuilding and furniture will not fall short of $1,000 which, with what we have already ex-

pended, will make her cost almost as much as a frigate." He found it "surprising that everybody wants to go into steamboats for, should our patents be out of the way, steamboats would ruin many proprietors and enrich none." He doubted whether such boats would "ever pay us interest adequate to the expense," even though he found some consolation in being able to add that "the legislature has extended our grant to thirty years."

Such talk was of course designed to discourage the colonel, and certainly he was not much cheered by the news of New York's latest action. It would be bad enough to have to fight Fulton over a patent infringement—something the colonel's respect for patents made him additionally loath to do—without having to wait thirty years in order to avoid fighting over the Hudson as well. At this moment he received from the chancellor's brother, John R. Livingston, an offer for a share in the *Phoenix* which he was strongly tempted to accept; but for suspecting the motive to be a gradual elimination of himself from steamboating, he would have accepted it. To have done so would have saved him the vicious competition which John Livingston, with the *Raritan*, later offered him in a cutting of rates which made the whole question one of length of purse. But his Scots blood made him stubborn. His life was plentifully sprinkled with fights which, once begun, he never wholly abandoned. Not always right, he made a fair record for openness to conviction; until convinced, he stuck to his guns.

Ready to operate the *Phoenix*, he saw that to attempt doing so upon the Hudson would be suicidal. The influence that could secure a thirty-year monopoly would be unbeatable in New York courts, no matter what retaliatory action New Jersey might be induced to take. Upon this entirely accurate conclusion, he began considering what other waters

Proposals

FOR ESTABLISHING A LINE OF

STEAM BOATS

ON THE DELAWARE, BETWEEN PHILADELPHIA AND WILMINGTON—AND ON THE CHESAPEAK, BETWEEN BALTIMORE AND THE HEAD OF ELK.

IT is proposed that the sum of 75,000 dollars be raised by a subscription of seven hundred and fifty shares of one hundred dollars each, for the purpose of building THREE STEAM BOATS.

The stockholders to be entitled to one half of said Boats, and the other half to be the property of the subscriber, he pledging to them the whole of his proportion of the revenue of the Boats until they shall have been reimbursed the sum of 37,500 dollars. This loan of 37,500 dollars to be considered as a compensation for his services and patent right.

The subscribers to pay fifty dollars on each share, when three fourths of the whole stock shall be subscribed, and the remaining fifty in a note at 60 days.

The sums subscribed, to be deposited in the hands of one or more persons to be chosen by a majority of the subscribers. Advancements to be made to the subscriber, as the work progresses, so as that the whole of the subscription be paid to him within one month after the Boats shall be running as Passage Boats.

JOHN STEVENS.

AGREEABLY to the terms and conditions contained in the above proposals, *WE, THE SUBSCRIBERS*, do hereby agree to become interested in the abovementioned stock, and to pay into the hands of the person or persons hereafter appointed, our respective subscriptions, according to the number of shares annexed to each of [illegible]

PHILADELPHIA, Nov. 19, 1810.

NAMES.	NO. OF SHARES.	PLACE OF RESIDENCE.
Robert Fulton	10	New York No 133 Chambers St.
Robt R Livingston	10	Clermont State of New York
John R Livingston	10	New York 67 Broadway
Wm Cutting	10	New York
L Osgood	10	New York No 9 Cherry Street
Nath Pendleton	10	New York. No 17 Wall Street
Dewitt Clinton	10	New York 52 Broadway
John Garnett	10	N. Brunswick
[illegible]	10	No 1 Wm Street New York
Peter Jay Munro	10	No. 36 Broadway New York
Charles Loss	10	New York Corner of Hudson & Hetty Str.
Robert McQueen	10	New York No 72 Duane Street
John Watts	10	New York — 3 — Broadway

THE FIRST SUBSCRIBERS TO THE BRUNSWICK LINE

might be available to him as a means of shortening the long and wearisome journey between New York and Philadelphia. Although the Amboy run might involve him in so-called trespass upon New York Bay, he concluded to issue "Proposals for Commencing a Line of Steam-Boats from New York to New Brunswick, & from Trenton to Philadelphia," planning to build two boats, a hundred feet long and sixteen in beam, with a speed of not less than five miles per hour and prospective completion "in every respect as passage-boats on or before the first of May, 1809."

Estimating that "through" passengers between New York and Brunswick would average fifty a day, in each direction, he proposed to carry these at $1.25; at which figure he expected a good profit because he set the operating cost of each boat at $25 a day. Based upon the *Clermont's* consumption of "from 12 to 14 cords of pine" between New York and Albany, he allowed eight cords for the Brunswick run of less than half the Albany distance.

Wood, at 10 shillings per load	$10.00
2 firemen & 2 sailors, at 10s per day	5.00
Captain, per day, say	3.00
Extra expenses, say	7.00
	$25.00

Expecting that winter seasons and other interruptions would reduce the operating year to 250 days, a "nett of 25,000 dollars per annum" seemed likely. Way passengers, coming aboard at such stops as Rahway, Elizabethtown, and so on, were to be counted upon for an additional $5,000, this sum being regarded as sufficient to meet the probable cost of any repairs. Hence the colonel felt justified in offering to guarantee to prospective subscribers a dividend of

not less than 8 per cent., payable "quarterly or even monthly," on the one thousand shares which he proposed to offer for sale simultaneously at the house of John De Graw in Brunswick and—inevitably—at the Tontine Coffee House.

As soon as the proposals were made public, a barrage of anonymous letters was opened upon him through the newspapers. Although he was later to become accustomed to such covert attack, he was now infuriated by the insinuations of "A Friend to Useful Invention and Justice," who held forth in the "American Citizen" for October 27 (1808). Under the guise of wishing to subscribe but wanting further information, this "Friend" asked a number of questions, certainly very cleverly designed to belittle the colonel's efforts in steamboating while lauding those of Livingston and Fulton. In particular, the point was made that the suggested line to Brunswick might infringe upon Fulton's United States patents—a most unfair thing to contemplate. In slightly different language but to exactly the same effect, other unidentified writers followed the "Friend's" example.

It was the colonel's own habit to sign what he wrote—even many of the hundreds of rough drafts of his various letters. At the bottom of whatever he said in a newspaper letter there invariably appeared John Stevens in bold-face, and of his reply to the "Friend" he made no exception. He was, he said, "extremely mortified to notice an anonymous publication of so offensive and indelicate a nature . . . designed expressly to operate against the subscription to be opened this day," yet, "in order that no one objection may remain unanswered," he would reply to it. Soon afterward the "Citizen" duly reported that "upwards of fifty shares" in the new line had been subscribed for on the first day,

while "L'Oracle" and "Daily Advertiser" "perceived with much pleasure" that steamboating would no longer be confined to the Hudson. "Colonel Stevens," said "L'Oracle," "is a gentleman whose public spirit is well known, and who has eminently contributed to mechanical and agricultural improvements, both by his genius and patronage. His name will be enrolled in the archives of patriotism [because he] has become the parent of this scheme to facilitate travelling and promote intercourse between the two greatest cities of the Union." With this and other encouragement, a group of interesting signatures appeared upon that original subscription list—Fulton's, Livingston's, and those of a number of the chancellor's relatives and friends. However, before the first column had been filled, the colonel made a most startling discovery.

Remembering how often there had been impressed upon him the danger of infringing upon Fulton's United States patents, he had become more and more anxious to examine these patents. Once he knew just how they were drawn it would be easy to decide whether he could actually be said to infringe them with his own machinery, and hence possible to defend himself against a charge which he sincerely considered unfounded. Until he had copies of the patents in his hands his position was uncertain; to get such copies appeared to be merely a matter of writing, as he accordingly did, to the secretary of state. A few days later he opened an envelope in the familiar hand of Dr. William Thornton, by this time superintendent of the Patent Office. Under date of November 2, 1808, he read:

> You write for a copy of the specifications of Mr Fulton's Patents for Steam Boats. . . . Not being his invention, he has never applied for a Patent, and he has none except the one I mentioned to you in New York. [Floating mines.]

The colonel utterly refused to believe his own eyes. He had believed them in reading the long letter from the monopolists, with its repeated statements of the impregnable Federal position and its final offer to protect him, under certain conditions, with their unassailable patents. Since Thornton must certainly be wrong, the colonel's pen fairly sputtered in another note, asking for corroboration. To this, Thornton was no less prompt in replying:

> I am of the opinion that he [Mr Fulton] is impressed at present with an idea of its [the North River grant's] insufficiency and is now preparing to take out a Patent for a Steam Boat containing all that he thinks essential; however, he has not yet taken out any patent whatsoever.

To put it mildly, the colonel was stunned. Then the monopolists, for all their high talk, had no Federal protection whatever? The boot was decidedly upon the other foot and their standing not to be compared with his own. The many involved passages in their long letter suddenly became clear and he was no longer puzzled by their laying so much stress upon the rights of individual States. With the United States obviously upon his side, why not risk a battle in the New York courts? Why keep up an effort to get subscribers for his Brunswick line when these subscribers now appeared as mere dummies set up by Fulton and Livingston? If he could borrow enough money elsewhere to manage the business, why let the monopolists share in the profits, even if they did not take the business away from him? He prepared for a radical change in his plans.

Wishing to keep the colonel well posted, Thornton in January reported having seen Fulton and learned that the latter was "engaged in making drawings and Descriptions of his Steam Boat" preparatory to applying for a patent.

If Fulton carried out this intention, remarked Thornton, "he must give up his exclusive claim on the North River, of course; but I have never thought it efficient," even though "he is certainly a man of great genius and ability." A week later Thornton wrote the colonel again:

Jan 23, 1809

On the 19th, Mr Fulton brought his work, which is very extensive and contains his improvements in the Steam Engine, and the various modes of applying its power. I have but slightly examined it but do not agree with him in his calculations.

In this patent Fulton set forth his whole theory of "plus pressure" and "minus pressure," hull-resistance, and engine-power. It is an interesting discussion—a remarkable one, in view of what was then generally believed concerning these theories—but, as we now understand such things, it could hardly be called a patent at all for the very reason that it was theoretical. Any remaining doubt as to the date when it was issued has been removed, notwithstanding the destruction, in the Patent Office fire, of the original records. A manuscript, unquestionably written by Fulton himself and now in the Pierpont Morgan collection, contains the specific statement that "On 11 February, 1809, Mr Fulton received his first patent." There is thus established for Colonel Stevens, in steamboat patents, a priority of well over seventeen years. It is not astonishing that he thought it hardly fair to accuse him of infringing upon patents not yet applied for, much less issued, when he built the *Phoenix*.

However, the moral side of the question stuck in his mind and made him all the more anxious actually to see and study the patents of Fulton. At his request, Horace Binney made a trip to Washington, duly reporting that the secretary of state would shortly forward the much-wanted copies. Binney,

as his personal view, held that "intimacy with the Patent Laws and the opinion of the Secretary" justified Thornton in declaring Fulton's "patent not worth sixpence and the monopoly of the North River, in point of law, of as little value." As to this the colonel, not receiving a copy of the patent, could not judge. He therefore sent his son John Cox to Philadelphia, with the double purpose of interviewing Fulton to request copies and of discovering, if possible, the whereabouts of any living heirs of John Fitch. Also, if Henry Voight made any claims, they were to be investigated. John Cox duly reported that he had seen "Mr. Fulton but thought it best not to ask of him as a favor, or what he considers as such, what we could have as a matter of right." As to the other objects of his trip, he wrote:

> I have seen Mr Voit, the only one alive of those you mentioned as engaged in boats. . . . He said he made repeated experiments with wheels both on the side and in the stern. . . . Neither himself nor any other person thought them new even at that day (although a Mr Sprague did get a patent for them which is now run out and public property) as he had seen them used in Scotland frequently.

Definitely determined to keep side-wheels in the *Phoenix*, the colonel was pleased with this fresh evidence that others supported his view of them as available to any builder, provided some particular design of combination belonging to another was not copied. Robert, most deeply interested and with a head already filled with ideas, could see no infringement in the use of a mere mechanical principle. Changes which Robert did suggest were the putting of timbers outboard of the wheels, the strengthening of the hull of the *Phoenix*, and an attempt at what has since become known as "hollow" stream-lines. While these changes were in prog-

ress Chancellor Livingston wrote, suggesting that all work be stopped.

This plea was not made directly to the colonel but to Rachel, the chancellor insisting that he wrote to her because her husband had treated his previous overtures "with contemptuous silence" but might yield to her influence. As a "last effort," said he, he had persuaded Fulton to concede "the ferries to and from New York and Long Island and the Jersey Shore, as well as the runs from Trenton to Philadelphia"—surely a great concession, when the only condition was the colonel's taking out a license from Fulton for the operation. In conclusion he added, "Notwithstanding the utter contempt in which Mr Stevens thinks it decent to tell the world he holds our rights, be assured we have not the slightest doubt of their validity. Nor can I think myself less competent to decide upon a question of law than Mr Stevens." To be sure, this question of competence was one that would not be settled for many years, and then require a Chief Justice of the United States to do it, but this was not the cause of the colonel's resenting the chancellor's letter. The colonel had plenty of respect for Rachel's opinions and no small appreciation of the financial help her inheritance often made it possible for her to offer him, but she was a woman and the year was 1809. He suggested to her that, rather than interfere in his business, she stick to her tatting.

To the monopolists, as one more effort to preserve peace, he wrote a fresh proposal:

> In case my present boat cannot be made to go with a greater velocity than yours, I will relinquish to you wholly the navigation by steam of the North River. Should the contrary be satisfactorily proved by repeated and fair experiments, I will restrict myself to running one boat against your two, and also

grant you the right to use, on the North River, any improvements I have or may make in the construction of steam boats.

Should these propositions not be acceded to, before I commence running my boat, I shall hold myself at liberty, in respect to navigating by steam, to act as my best interest may dictate.

With a sporting proposition the monopolists would have nothing to do. They held the Hudson; why risk losing even part of it? From his relatives and friends, scattered through the legislature, the chancellor could learn in advance what that body was likely to do and what might happen in the Jersey legislature. From his cousin, Judge Brockholst Livingston, he could almost as easily learn the probable character of any decision likely to be handed down from the bench. For the monopolists to take a chance upon the speed of the *Phoenix* was much less safe than depending upon the colonel's feeling, at heart, that their clutch upon the river was unbreakable. As a result of this shrewd guess, Fulton's *Raritan* was made ready to give the colonel a sharp fight. She was turned over to John Livingston, and the latter, soon after the *Phoenix* began running to New Brunswick, served a notice upon the colonel. In a challenging letter he announced that the *Raritan* would take the same route as the *Phoenix*, with a passenger-rate one third as high. She would make her runs on the same day and at the same hour as the *Phoenix*. As the colonel himself put it, "had Mr. Livingston confined himself to threats of prosecution merely, I should probably have remained and waited the event of a suit. But when he had recourse to a species of warfare which it was presumed my limited finances would not admit of my engaging in, I retired." Just as he abandoned the Brunswick run, he again asked Fulton for a copy of his patent.

Fulton replied at once, regretting that he had "left the

patent at Clermont," but stating that he would bring it down after his next visit and go over it with the colonel. The latter would then clearly see that there were "points on which the success of steamboats depends," which Fulton and Livingston had "discovered and made visible" but could not give up without "throwing them open to the world and rendering them useless" to themselves and the colonel alike. Why he thought this could be true of a proper United States patent he did not say, but he did add that he and his partner would "cheerfully give the patent" to the colonel "for rivers which have not been preoccupied." He spoke of the Delaware as "a fine river" and contended that there were "numerous situations in America which must be productive." Let the three of them, he suggested, "meet and investigate like friends," because "more good is to be done by reason than by law."

On its face a conciliatory letter, the colonel mistrusted it. As to Fulton's wishing to keep his "plans" secret, the colonel insisted that it was not *plans* but *machines* upon which he wished to be informed. He knew that Fulton was equally eager to see all that he had himself designed during the past year, if only to make good his claim that the colonel was using "part of the principles I have discovered and patented." Believing principles, in themselves, to be unpatentable, the colonel concluded not to show Fulton anything until he had seen the Fulton patents. That he was likely to have a long wait is evident enough from a letter written by Fulton to Dr. Thornton. This is preserved in the Thornton correspondence, dated on the same day on which Fulton wrote the colonel he had forgotten his patent at Clermont.

May 9, 1809

Having been informed that Mr Stevens had applied to you

THE "PHOENIX" AT SEA

for a copy of my patent, I request that it may not, or any part of it, be forwarded to him without your first having my consent. No suit is yet commenced and, until the law demands it, it is not my intention that he should have the examination of my patent. You will, I hope, see the propriety of complying with this request.

After reading this, Thornton hesitated to send the colonel a copy of the patent without authority higher than his own. The letter substantiates the claim that the colonel, until long after the *Phoenix* was completed and running, never saw Fulton's patent. While still waiting hopefully for it he began more seriously to consider the possibility of moving the *Phoenix* to the Delaware, a river which he believed Fulton and Livingston could not possibly control. In this there was also an element of pique, for Fulton had just published in the newspapers an open letter demanding that the colonel, "by 6 o'clock" on the day of publication, produce the answer to a problem in proportions and velocities offered as a test of his mental agility. The colonel was not to be trapped into sending a possibly incorrect solution through the same public medium. Merely replying that he preferred to make his claims good with actual steamboats rather than with pen and ink, he resumed his study of the Delaware.

At Trenton, or perhaps at Philadelphia, he might buy or build repair shops. To send down to the Delaware, as superintendent on the spot, he had Robert, who knew the *Phoenix* from stem to stern. With Robert at the helm the steamer might, before other competitors entered the field, secure the greater portion of the passenger and freight traffic on the river, notably that end of the Philadelphia-New York business. Finally, since New Jersey, by laws of reprisal, might

enable him to keep Fulton out, the only great difficulty appeared to lie in getting the *Phoenix* actually around into the Delaware.

No steamer had ever yet ventured upon the open sea. What sailormen called a mere "working breeze" for their canvas had been dreaded by primitive engineers, because it set up ripples in the rivers and bays, breaking the "purchase" of their eccentric oars or paddles upon the water, creating unprovided-for strains, and even stopping steam traffic for days at a time. In the colonel's own case, one experiment or another had frequently been postponed on account of "the weather being too bad and the river too rough." In the general view, the business of steamboating was wholly a "flat-calm" affair. Hence, when the word was passed along the New York and Hoboken waterfronts that the *Phoenix* was to be sent "outside," it was received with cold disbelief or open sneers. Old-timers, sitting on the docks between cruises under topsails, took their pipes from their lips and spat derisively into the river. A steamboat on an ocean voyage? They would as soon volunteer for that as for an expedition to the moon.

Robert Livingston Stevens, just past his twenty-first birthday, was of about his father's height, but darker and rather more finely drawn, his mind a battery of ideas that charged his wiry body with energy. Watching every nail driven into the hull of the *Phoenix*, he knew the length, size, and weight of every part of her engine, with the particular reason for its choice. To him, as she lay at her Hoboken dock, she represented not only an advance upon the past but also an auspice of the future. His eyes, like his father's, gleamed at the shadowy steamboats he foresaw in the years to come; his quick ear picked up the beat of their propel-

lers. What older men might call the folly of risking an unseaworthy craft was to him the beckoning of adventure. For captain and engineer, the colonel need search no farther than Robert.

In the early days of June there was much careful study of the weather. The colonel's telescope, on its tripod in the piazza of Stevens Villa or out upon the bluff over the river, swept the eastern horizon, while every cloud was watched and every fractional change in the barometer was noted. Below, at the pier, the *Phoenix* ran her last dock-trial and stowed the last possible stick of firewood from the back lots. On the appointed morning no puffing tugs worried her bow and stern; only a pittyauger or two prepared to tow her into the stream, while offshore a small schooner stood by to act as escort. In the opinion of experts, when the open sea had its way with "that tea-kettle," the schooner might possibly save one or two of the crew. Numbering no more than the handful that to-day might watch the routine sailing of the Fall River Line, the crowd that gathered to watch the ship unmoor included only the colonel and the family, a few intimates, and the carpenters and mechanics. As her shrill little whistle cleared its throat, no belated mail-truck nor breakneck taxi dashed alongside. When the last line snaked around its pile and splashed into the river, Robert waved his hand and took up a small sheet of note-paper.

1809 Journal of the Steam Boat Phoenix's passage from New [York] to Philadelphia.

Sat'y June 10th. Cast off from the Wharf at 11 O'clock a m, the wind at S S S, a pleasant breeze but foggy. Got our steam up by noon. Came to an anchor at the Quarantine ground at 1 o'clock p m.

Sunday 11th

Foggy weather with light breezes at S S E. At 8 O'clock p m weighed to clear hawse. At 10 the wind shifted to N E partly clear.

Monday 12th

Got under way, the wind at N, steering for Sandy Hook, blowing very hard. While crossing the bay, one of the revolution Wheels on the Starboard gave way at 2 p m. Anchored in Spermacetti Cove, 7 miles S W from the light house. Shifted the buckets to Starboard.

Tues'y 13th

Got under way at 1/2 past 12 a m, Lay too for our tender but owing to a calm she could not accompany us; at 4 o'clock, we past the lighthouse, very light air from N E; at 4 o'clock p m the revolution Wheel on Larboard side gave way just as we were about to cross the bar at Cranberry Inlet; at 20 minutes past 4 came too in the Inlet & warped her to her anchorage. Squally, dirty weather from S all night. Our tender has not yet joined us.

Wed'y 14th

Wind at S blowing a gale, weather clear. Shifted the buckets of the Larboard Wheel. At 9 p m wind veered round N W, then died away calm & at 1/2 past 10 returned to S, cloudy & lightning. No appearance yet of our tender.

Thurs'y 15th

Cloudy Weather a m. Abt 1 p m very severe lightning, thunder, & rain. Winds variable. Sent to Tom's River for stores. The tender still absent.

Friday 16th

This morning our tender joined us. Rose the steam at 8 o'clock a m but concluded it rash to encounter the great swell abroad & the intricacy of the inside passage as the wind shifted from N to E to S, with every appearance of Stormy Weather. At 9 p m moderate and pretty clear.

Saty 17

Got under way & past the bar at 6 o'clock a m. Wind at N E At 9 came too in Barny Gat, the weather appearing very doubtful. Our tender not yet come up to us. The winds variable thro' the first part of the day. Abt 6 p m the wind began & cont'd all night to blow a hard gale from E, accompanied with constant heavy rain.

Sunday 18th

A heavy blow & rain from the S continues. Our tender has not yet joined us. Wind variable from daybreak to 11 a m, with thick S squalls, then shifted to S S W, p m, moderate & partly clear. Blew hard thro' the night; drove a schooner on Shore. The tender still absent.

Monday 19th

This morning moderate, with the wind at S W. Wind continues at S W, very pleasant Weather, but a very heavy sea on the bar. Our tender still absent. Took in some water, p m.

Tuesy 20th

This day has been moderate, wind at S W. Our tender joined us about 10 a m & our boat went on Shore to Weir town for supplies. William Lindry left the vessel.

Wedy 21st

Got under way & past the bar at Barny Gat at 3/4 past 4 o'clock a m, with a smart breeze at N E. Past Little Egg harbour, 1/2 past 7 a m; New Inlet at 8 O'clock; Absequcum by abt 10, & G. Egg harbour by 12 O'clock. The breeze decreased to a light air; at 4 p m, a heavy fog. At 1/2 past 4, Harriford; could not get in, consequent of the fog, bore away for the Capes. At 7 the wind hauled round to E b N. At 45 minutes past 7, came abreast of Cape May; came in 5 fathom Water, Wind at E.

Thursy 22nd

Got under way, first of the flood, wind at South, foggy. About 10 O'clock, left Cape May. Abt two O'clock p m, thickened up with Lightning & Thunder. At 3 O'clock, the wind chiefly died away; a light air at N E, accompanied by rain, lightning, & thunder. At 1/2 past 5, the wind came round to S E & S E b E. Successive Showers thro' the afternoon. Past New Castle at 5 minutes after 8 O'clock & came to an anchor at 10. Wind about East, very light.

Friday 23rd

At 45 minutes past 4 O'clock a m, got under way; past by Chester at 1/2 past 6. A very light air & the boilers very foul. Came to at 10 O'clock. At 1/4 past 5 p m, got under way; little or no wind. We did not raise the steam, drifted up with the tide. At 6 O'clock, past Mud fort. Anchored at 9 O'clock, abreast Market St Wharf, Philadelphia.

By nature, Robert was the most laconic of men. Existing letters of his are disappointingly few in number and very short. None of them attempt to amplify this story nor even to suggest that it was in any way epoch-making. The log itself has only four more entries, dealing with the shipping of "Daniel" as waiter, "at Thirteen Dollars," and with the employment, at an unnamed figure, of Joseph Smith as "Pilot & hand." On the twenty-sixth of July one further note is added:

This Evening the supposed William Smith was drowned coming or endeavouring to come on board; he is missing this 25th inst, & several circumstances corroborate the idea of his death.

This was the only tragedy; indeed, the only mishap. It did not occur until the *Phoenix* had fooled the deep-sea

sailormen by arriving safely in port. Of what happened to the tender, there is no accurate record beyond the evidence of her struggle with head-winds and the obvious fact that she was of no great help to Robert. But he was never one to need help in making steamboat history.

CHAPTER THIRTEEN

Henry Voight, former associate of Thornton and John Fitch, had now become chief coiner of the United States Mint at Philadelphia. Thornton, resenting Fulton's claim of absolute priority in all steamboat invention, wrote his contrary views to Voight and asked for support of them. Voight's reply, dated June 28, 1809, and now in the Thornton correspondence, discussed both Fulton and the recent arrival of the *Phoenix:*

The first thing you mentioned in your letter is, that Mr Fulton claims the invention of the water-wheels with which he propels the boat. I believe he knows better, although he lays claim to the invention. I well remember paddle-wheels. I think the first use was in England. . . .

I have purposely delayed sending this letter sooner, although the foregoing had been written several days already, because I heard that a Steam Boat was to come here from New York, which has arrived last week, but I have not been able to get a sight of her as yet. My son has been on board her, who tells me he could see no part of her machinery but the paddlework.

This is not a boat of Fulton's but of an opposition party [Colonel Stevens of New York] which protests against Fulton's being the first inventor of paddlewheels. They have obtained the same information from me, some time ago, concerning paddle wheels, which I now give to you, and I believe they have made further enquiry into it and have found what I said to be true. . . .

I have been told the boat is 100 feet long, but know not the breadth of the beam. It has two masts for sails and is to ply from this place to Trenton. I have not heard of any trip being

made there yet. Whatever news I shall see or hear of this boat, I will inform you of from time to time, if you think proper.

Before he sent on the letter, Voight added a postscript. "July 10th, the Steamboat has made a trip to Trenton yesterday, & performed it 8 hours up and 8 hours coming back." This fixes, closely enough, the date upon which the colonel began that service on the Delaware which for so many years occupied his own attention and that of several sons. That the little *Phoenix* needed considerable equipment before she could be called a first-class passenger steamer is evident from the inventory taken just at this time.

11 Mattrasses
11 Pillows
11 Doz. & 6 tumblers, insufficient for a large company or the tables that may be laid.
1 Large & 1 small pitcher.
5 Doz. & 10 Wine glasses
1 Castor, insufficient
2 Doz. Cups & Saucers, insufficient
2 Tea Pots, insufficient
2 Sugar Dishes, insufficient
1 Slop Bowl (cracked) insufficient
3 Hanging and fixed looking-glasses
4 Brass Candlesticks
Towels, none (except those brought yesterday) and two very small worn ones
A skimmer and iron ladle are wanted, also a fish fork.
Also a large size kettle to boil coffee when coffee and tea are wanted.

As it was expected that the waiter, or steward, would soon have more than this to handle, his wages were raised from thirteen to sixteen dollars a month. From the start, Robert was determined that there should be nothing wanting in the new "Line." To him, a cracked slop bowl was scarcely

less a sign of poor service than a cracked piston; either would be no fit shipmate for the *Phoenix's* passengers.

To the colonel fresh courage and impetus came from further correspondence with Thornton. The doctor had referred the question of public inspection of patents to the highest authority; of this he wrote the colonel on July 8:

> I have at last received from the Attorney-General an answer in favor of those who have applied for copies of Patents and, whenever you require a copy of Mr Fulton's, it will be furnished. I have lately heard that he had entered an action against you, but do not think he would run such a risk. He cannot, nor do I presume he thinks of attempting to, prevent me from using *every principle* he has now in use, while I can exclude him from many improvements; and, having already exceeded his utmost efforts yet made in navigation by steam, I am confident I shall soon be able to convince him that he is very far from perfection—though I acknowledge his great genius and ability.

This cleared the air. At his leisure, the colonel could now study exactly what protection had been claimed by Fulton, and what machinery had actually been patented. Finding that, in actual *invention,* there was really little or no issue between Fulton and himself, and believing, as he always had believed, that mere *principles* could not be patented, he felt greatly encouraged to proceed with the *Phoenix* and also with plans for her successor. Even if Fulton's patent protected his own engine, it could not prohibit others—let him claim what he liked. In thermodynamics, hull-resistance, wake-currents, and so on, one might make *discoveries;* once made, these became, like the law of gravitation, public property. For Fulton to demand exclusive rights to principles appeared to the colonel no more logical than would seem to us the claim that but one citizen of Detroit may build automobiles.

Perhaps Fulton himself had doubts about his position. In November he and Livingston, in another joint letter, assured the colonel that they were "still willing to give you every advantage of our machinery and experience." Protesting that they did not want the colonel to make any *public acknowledgment* of working under their patent, they hoped he "could have no objection to *privately according to such an admission.*" In reply the colonel repeated, "in the most explicit terms," that he did not find his boat and machinery to be any infringement of theirs; moreover, he had made a number of improvements which he proposed to patent in his own name. "Unless," he added, "I am ready, in *forma pauperis*, to subscribe to terms the most humiliating, I am probably doomed to be pursued and persecuted, on the Delaware, in a manner similar to that employed on the New Brunswick run." Yet he wished it distinctly understood that "all prospect of accommodation would end," the moment he was attacked on the Delaware. Since "no less than four gentlemen of the Bar, of distinguished eminence," gave it as their decided opinion that the Hudson monopoly was unconstitutional, he thought it might well be to his advantage to fight it out legally rather than compromise even on his own terms. This, provided his new improvements succeeded; otherwise, they might make themselves "perfectly easy," for he would have neither "the ability nor the inclination to contend further" with them.

Since the *Phoenix*, during the past season, had actually been carrying passengers and freight between Trenton and Philadelphia with sufficient success to argue a good future, Fulton evidently thought it best to suggest the meeting which was held on November 27. After long discussion, the rough draft of an agreement written out by Fulton provided that the parties should "relinquish to each other recip-

rocally all patent rights which they now or hereafter might have respecting steamboats." Fulton and Livingston were to have New York, including Lake Champlain; the Brunswick run; and the Ohio and Mississippi, with the general reservation that the Stevens improvements should not be used by them in establishing ferryboats between New York city and the Jersey shore. The colonel was to use anything of Fulton's on the Delaware, the Chesapeake, the Santee, Savannah, and Connecticut rivers, as well as the Providence run. All these were to be his for the next seven years, provided that, if he had not in that time established steamboats on any particular water, that one should revert to Livingston and Fulton. Further, it was provided that each party should pay the other, for the use of any new improvement, "a reasonable consideration." Fulton took one rough draft to copy and wrote the colonel next day:

> I send you the writings in substance and effect the same as stipulated. As it is impossible to foresee how many may attempt to evade us, you must look for shelter under my patent. If I fail, all your rights go. I have therefore worded our contract to correspond with my patent, mentioning what I consider my particular invention, particularly these demonstrations and the superiority of wheels in due proportion.

Although he disliked the preamble as giving the distinct impression that all the inventions were Fulton's, yet after some demur, he signed the agreement and sent it on for the chancellor's signature. Unexplainably—in view of his previous efforts at compromise—the chancellor now thrust a spoke into the wheel. He inserted a proviso to the effect that the colonel, for his heirs and representatives, did "fully and absolutely recognize" the right of Fulton and Livingston to all inventions and improvements specified in their patent,

as well as their exclusive right to navigate New York waters by steam for twenty years. Perhaps Livingston's early training made him favor tortuous legal phrases and want every possible clause in an agreement. In any case, the colonel flatly refused to sign the amended agreement but allowed his name to stand upon the one drawn by Fulton.

Meantime, he proceeded with modifications on the *Phoenix*. Stout enough to go to sea, he thought her too heavy and clumsy for river work; an opinion in which Robert, always interested in line and speed, concurred. Later, the colonel designed changes in the engine, and in order to avoid charges of infringement he showed a model of the new design to Fulton. Having looked at the model, Fulton rummaged through his desk and produced a rough pen-and-ink sketch. This, he said, was "the combination exact" as invented by himself in 1802. Seeing this sketch for the first time, the colonel asked if it had been patented. Since it had not, Fulton admitted that the colonel was quite within his rights and had actually added an improvement. Some time afterward the chancellor "briskly accused" the colonel of taking out a patent for an invention really Fulton's. "Nothing of the kind," the colonel was beginning to retort, when Fulton interrupted to admit there was no infringement. Indeed, Fulton noted this upon one of his later drawings as "invented by John Stevens," and said the same thing in a certificate he wrote and asked Thornton to sign. However, in the Morgan library manuscript he gives it as "Mr Fulton's" opinion that the design was really his own. It is to be feared that Fulton's crown, whatever else it contains, does not bear the jewel of consistency. Neither, for that matter, did Livingston's. Frequently, they exchanged their positions; the one combative, the other conciliatory. Eventually the colonel found himself unable to meet these sudden shifts of

wind and therefore deemed it best simply to remain always politely belligerent.

The colonel's patent dated January 3, 1810, covers this new method of communicating "the power from the piston to the water-wheels by means of crank-wheels and shackle-bars which work on each side of the cylinder." It also covered a modification of the air-pump, giving this a double stroke and providing for pumping injection-water from the bottom of the condenser while air was drawn from the top. Further, "the extremities of certain levers, connected with the stems of the valves," were designed to strike "projections fixed on the circumference of wheels which revolve in equal times with each stroke of the piston, and by this means the Steam can be shut off from the cylinder at any part of the stroke." As so often happened, the colonel was here breaking ground for Robert. The latter, with his nephew Francis, was later to devote much time to the "cut-off" and eventually to bring the device to an advanced stage.

The boiler included in this same patent was a fire-tube design. It had two horizontal water-drums, sixteen feet long, and a smaller steam-drum, placed between the large ones "in the recess below their diameters where they touch." Water communication between the three was by piping through the front heads. The "flues" or fire-tubes—one to each drum—conveyed the products of combustion to the rear of the large drums, through the length of these to the front again; whence the "flame and smoke" escaped to the "chimney." To make joints between piping and drums, iron-cement was used, while the furnace underneath was lined with "soapstone or fire-brick," backed by "powdered charcoal, mixed up with a due proportion of clay." An advantage claimed by the colonel for both engine and boiler was

the "diminution of the weight of machinery, which hitherto has gone nearly to loading the boat to capacity."

In preparing the *Phoenix* for the season of 1810, the colonel adopted his latest improvements. It was her captain, Moses Rogers—later on board the famous *Savannah* when she crossed the Atlantic—who reported progress to the colonel.

Bordentown, Mar. 9th

I have arrived . . . with the *Phoenix*, all well, but had some trouble in fetching her down the creek on account of the wind being ahead. The boilers are likewise here safe and we are taking out the engine as fast as Posable. . . . The People of this town are most anxious for the Welfare of the boat; they have subscribed about 400 hundred dollars for to build a Public wharf for her to run to in this place, and do not think 'twill cost over that sum to do it.

The Proprietors of the Stages talk of running a stage through this place to Trenton and Princeton on the old road, and one on the Turnpike to N. Brunswick and Amboy, which if they do I think it will be better for us all. They are to meet on the subject at Princeton Saturday next.

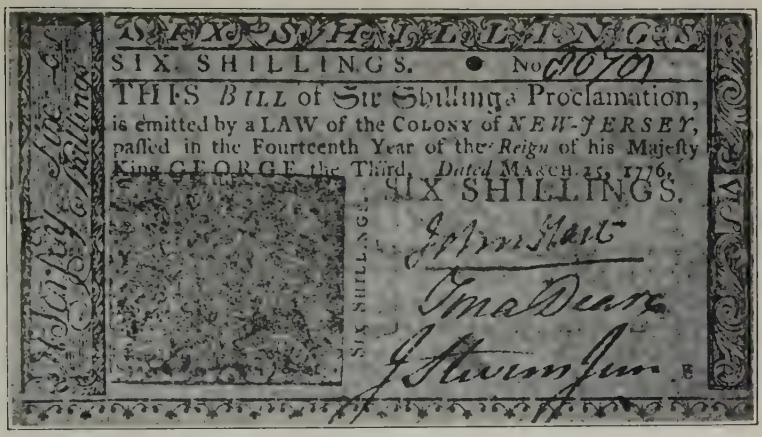
Since the day when the first John Stevens at last found himself "able to sit easy and dry" on their hard benches, stages had played a big part in Jersey transportation. Now, with the *Phoenix* running between Philadelphia and Trenton, and the *Raritan* connecting New Brunswick with New York, the need of a good cross-state link between the two steamboats became proportionately greater and aroused the stage-men to meet it. Robert Letson and Nicholas Van Brunt, at Brunswick, were the hot rivals of Perez Rowley, John Gulick, and Robert Bailie of Princeton; while Nathaniel Shuff and John La Foucherie, stabling their horses at Trenton, were just as eager to get the lion's share of the badgered, jostled passengers. All the stage-men naturally

looked for the colonel's patronage, each offering that suggestion for organization that would ultimately work for his own particular good.

"The road from Princeton to Trenton," wrote Gulick and Rowley, "is so good that few, if any, would object to a pleasant ride before breakfast." Even though this involved changing the boat schedules, no matter; the coaches could make earlier starts and hence be able to take off half their horses. Thus Rowley and Gulick would "be sure of haveing a better chance to get *sober* drivers." At which Shuff and his partner were up in arms, insisting that the arrangement would mean their running only one stage daily, each way. Since they had been planning for six stages, they "must face ruin." Letson and Van Brunt, too, were so indignant that the colonel had to make a special journey, trying all the coaches—something he did on the express condition that Rowley and Gulick would "take him on to Trenton in a gig in the morning." Even so, the stream of argumentative letters did not stop. Among them all, Shuff's were the most colorful.

> What would passengers say [he asked] when arriving here at 12 or sometimes at 11, wherein they would get to Princeton say 3 or 4 in the afternoon; there being obliged to stay all night or take some of White's stages and go by land? Passengers does not like to be detained on the road at this season of the year [April]. The reason will no doubt be asked—what excuse? Why, the horses is tired, we cannot run them further; you must wait till morning. I ask what effect this would have with Travellers? Many would say, why han't you a change of horses?

One of the chief difficulties, as Shuff saw them, was Gulick's refusal to "run the coaches in stile." Yet, not long


SIX SHILLINGS
SIX SHILLINGS. No 6070
THIS BILL of Six Shillings Proclamation,
is emitted by a LAW of the COLONY of NEW-JERSEY,
passed in the Fourteenth Year of the Reign of his Majesty
King GEORGE the Third. Dated MARCH 25, 1776.
SIX SHILLINGS.
SIX SHILLINGS.
John Hart
Ino Deare
J Stevens Jun.
Six Shillings.
To counterfeit is Death.
BURLINGTON in New-Jersey,
Printed by Isaac Collins, 1776.

JERSEY CURRENCY SIGNED BY COLONEL JOHN STEVENS

after, he was indignantly denying complaints against his own "stile."

> Particularly as respects passengers being put to sleep four and five in a room. But this you can perceive is a difficulty impossible to remedy, owing that the generality of travellers by the steam boat line are People of Fortune, accustomed to live in elegance and therefore adverse to laying more than one or two at the most in a room. And when there are thirty or forty, it is impossible to accommodate them to their wishes in this respect.

Perez Rowley declared that "the inhabitants of Princeton find it very convenient to leave home in the morning, and very few will go any other way than by steamboat. On the trip before last, a number of the passengers stopped at Trenton and went on to Philadelphia by land, for fear of riding in the dark from Trenton to Bordentown." Altogether the confusion was so great and the quarrel so sharp that Robert had to take a hand. Already he was making administrative reports to his father: "I let the steward have the Bar [concession] for $300," or "I think we better give the Captain something extra for assisting the clerk in weighing the baggage, which perhaps keeps them upon good terms with each other." Now he suggested getting all the stage-men together for definite agreement and fixed rates of fare. As a result, such an agreement finally was reached, John Livingston and the colonel on one side, the stage-men on the other.

The steamboat-owners promised to solicit passengers for the coaches, with the understanding that the coach paid the boat twenty-five cents for each traveler and paid the captains, as individuals, such additional percentage as the stage-men thought "right and proper." The stages were to be kept going at such a pace that, when the roads were good, no

stage should be upon the journey "more than 4½ hours, including all stops." But the drivers were to have positive orders not to run their horses nor "endeavour to proceed each other upon the way, so as to endanger or put in fear the passengers." In this way, and by giving one third of their business to each of the three leading competitors, the colonel and Livingston hoped to avoid, for at least the one-year term of the agreement, any further quarrels. On the whole, they were successful, but the stage-men went on wrangling over customers like buses from rival summer hotels. For a suitable consideration one driver would deliver his passengers only at one particular tavern; another was as immovable in taking them somewhere else. And that they were not always careful to identify their passengers, Rachel Stevens duly discovered.

After a pleasant trip [she wrote Robert] we arrived at Brunswick about half an hour after sunset, but sorry enough was I that you did not accompany us. I desire you would tell Mr LaFoucherie that, unless he gets a more obliging driver, no one will take his carriage.

All I could say, I could not induce him to stop at Keyworth's; he stopped at Van Brunt's, where we were obliged to get out. I then desired him to bring our baggage over; that he would not do, and the gentleman that was with us had to do it himself.

We were the first carriage in. I immediately desired Mrs Keyworth to shew me a room, but she was so much offended at my stopping at Van Brunt's that she absolutely refused to accommodate me at all, although there were no beds taken. I was placed in a most disagreeable situation.

A gentleman of New York, who came in the next stage and knew who I was, interested himself and told Mr Keyworth I must have a room. As soon as *he* knew I was the wife of the proprietor of the Steamboat, he was all civility—but nothing

short of absolute necessity shall ever induce me to stop at his house again.

All this happens from the obstinacy of Mr LaFoucherie's driver—which I beg you to tell him. We had a delightful pleasant passage to New York. I arrived at Hoboken by two o'clock.

What the colonel wrote to La Foucherie may easily be imagined. He was just as quick to take up complaints against his own service, for when he heard that the Delaware steamboat was not clean, he made a point of asking Mrs. John Wallace—whom he described as "one of our most particular women"—to take a journey and tell him her whole experience. Fortunately, Mrs. Wallace was able to say she found "everything perfectly neat, as much as a boat could be; conducted with the greatest regularity and the captain most polite and attentive." Those who breakfasted on board told her the meal was "of the best, especially cream, which was unusual for Bordentown at that season of the year." The indignant captain protested that the criticism had originated with some partisan of John Livingston, who, "if he heard all the reports against the *Raritan*, would have nothing to do but worry over them." But the colonel was too greatly relieved to bother about the source of the report.

Robert supervised the ship's books. "The clerk," he explained, "enters the names of all passengers under the names of the places they stop at, in one book; and, in another, enters the receipts on one side, expenses on the other, balancing once a week." The fuel account was large, explained Robert, because he was "obliged to buy all wood at Philadelphia, which has not been less than two cords a day, as ours here [Trenton] is too green to burn." As to actual business done, the poorest week's receipts were $183.39½;

the best week's, $852.12½; and, for the season's total of thirty-four weeks, $16,492.83½.

As one assistant, Robert had his brother Richard, although the latter was eventually headed for service as a surgeon in the navy. Richard's letters home were frequent and generally encouraging.

> Everything at present here, appears in very good order, and the passengers all seem well pleased with this part of the journey. But they complain very much of the land line. . . . When we came on, we had four horses and might have gotten into Bordentown an hour before the other stages. But our driver had an idea we must all arrive together and, had any of the rest chose to have walked their horses, we must have done the same!

A day or two afterward:

> The stages labour under the handicap of much baggage. One man had 4 or 5 large trunks, for which he payed very little.
>
> Yesterday I started for Wilmington and had one of the shortest passages that has been made these three years. The whole distance is 29 miles. The wind blew very hard and the water ran—once, a foot on the deck. Everything in the cabin, benches, breakfast table, etc, were overturned. There was a drunken man on board who came very near being drowned; he kept continually dancing about the deck until at last they had to tie his hands and feet and put him in the hull.
>
> The captain fixed up an open stove in the cabin and connected the smoke pipe with that of the furnace. This has been much wanted; for some time past it has been very cold on board, the early part of the day. The passengers of course crowd around the boiler and engine, so that James Lee [the engineer] can sometimes scarcely turn himself around.

Still later, Richard made some estimates of speed:

The boat [he said] left Ph. on Friday with 37 passengers, 25 for Bordentown and 12 for Burlington. I had St John's stop-watch with me, with which I endeavoured to ascertain her velocity by throwing a chip out at the bow; and, what is very singular, I made it 5 miles without a fraction. I tried it 2 or 3 times and always brought the same result; but she goes faster, I think, since the wheels have been raised. I made the same sort of calculation aboard the Raritan Steamboat and brought out her velocity about 4½ miles.

As the business grew, the colonel's nephew, Francis B. Stockton, was added to the Delaware staff. He, too, had some good ideas.

Hearing [he wrote his uncle] that on Saturday last the quaker meeting would break up, and consequently many wish to return *next* day to their respective homes, the Captain and I concluded it would be an object to run up to Bordentown and return the same day, which could easily be done. Accordingly, I took the liberty of putting an advertisement in the different papers relative to it. By going there, they made $19 independent of those for Bristol and Burlington.

Now you have every prospect of making something very handsome by the boat. She goes extremely well, passengers increasing almost daily.

With affairs on the Delaware in such good hands, the colonel planned to take Rachel to Europe. Incidentally, he thought he might combine business with pleasure. In view of what America had accomplished in steamboats, British or French capital might well be induced to seek investments or possibly to make outright purchase of his patents. It was then that he wrote his appeal to Thornton, with the description of himself already quoted. "The object I wish to attain," he said, "is to identify and protect our persons, in case of capture, as citizens of the U. S." But if Thornton sent him anything, it must have remained undelivered; as is

quite possible in view of what happened to certain drawings which the colonel had long been expecting from the Patent Office.

On enquiring at the Post Office myself [he said], I found the package had remained there nearly a month. This was owing to the caution of the Post Master. As there are several persons of my name in this city, he was apprehensive the penny post might deliver the package into wrong hands. And, as it was directed to Mr John Stevens, instead of John Stevens, Esq—the usual stile of letters addressed to me—he did not give it to the servant I occasionally send to the post office.

The non-receipt of his passports is a less likely explanation for the colonel's not going to Europe than his having to reply to so many scientific letters, written to him on every conceivable subject. A Colonel Tatham of Norfolk proposed a visionary scheme for carrying the rock of Snake Hill, on the Hackensack Meadows, by gravity railroad to New York for paving purposes. Almost in the same mail came a letter from the president of Princeton, Dr. Samuel Stanhope Smith.

Knowing your attachment to philosophical sciences, I have presumed upon your indulgence in proposing a few enquiries relative to the variations of the magnetic needle in this state, as far as it has come under your observation. I shall be much obliged to you for any information with which your own experience, or that of others upon whom you can rely, has furnished you concerning the precise variation at present and also at any designated time.

I will thank you also to inform me if you have found any regularity in the variations East and West, and if you are acquainted with any meridian, or points on the globe, at which, at present, no variation is discernible.

Perhaps the phenomena of the magnetic needle have not attracted so much of your attention as some other objects.

I presume, however, on your general taste for these important studies.

Much to his chagrin, the colonel was for once caught napping. Up to that time the magnetic needle had eluded him and he could do no more than promptly assure Dr. Smith of an intention to "communicate any well-authenticated facts obtained in the course of enquiries."

The successful season ended in some actual prospects of increasing competition on the water and in rumors of a great deal more. Daniel French of Philadelphia at this time announced his new engine as cheaper yet more powerful than any yet used. In his printed prospectus, French quoted Captain Moses Rogers as declaring the new engine to be "much the best yet." Rogers, taken to task by the colonel for an apparent disloyalty, hotly denied indorsing French and refused to join the latter in a plan for steamboats on the Sound. Almost simultaneously, Fulton discussed another possible competitor with the colonel.

January 2nd.

There is a company forming to build a steamboat to run between Philadelphia and Wilmington. This I have from Mr Bayard, a Senator from Delaware; the principle part of the subscribers, I believe, reside in Wilmington. The projector is said to be an Englishman; have you heard yet, or have you, or do you mean to take, any measures to prevent it? Or must it be permitted although it may be prevented, and then be decided by a lawsuit and an Intrigue to endanger all our rights? This is worthy of consideration, for it is important to get as many persons as possible to work under the patent; they will defend instead of attacking it.

I have told Mr Bayard that my plan for Building Boats by subscription is that, in each year, the accounts shall be settled and for the year all expenses being paid and a fixed sum allowed for wear and tear and repairs, so as to keep the Boat

in good order for the whole term of the patent. Then, should the neat profits exceed 10 per cent, the patentee and the subscribers to divide the surplus. That is, if the neat profits be 15 per cent, the subscribers take 12½, the patentee 2½. He says these terms are liberal and the company would prefer them to risque on experiments with a stranger, or a suit against us under the patent.

Now, let us see if this is not your best Interest, both as to emolument and to prevent violation of our rights. Suppose the Boat to cost $25,000 and her gross receipts $12,000. Expences $7,000, leaves $5,000. From this, 10 per cent (of original cost) to the subscribers—$2,500—leaves $2,500. Half of this to you—$1,250—and perhaps more, without trouble or advancing a cent, and guarding our patent by making advocates. Please to consider this and write me immediately if you approve the plan, and be assured this is your best plan. I will have the arrangement made. Reflect well if this is not better, than to make enemies and to have a lawsuit.

Livingston and Fulton were chary of suits in New Jersey or Pennsylvania, where they were not apt to appear in a light as favorable as that which fell upon them in New York. This State had granted their monopoly; were not her courts bound to uphold it? So, at least, they argued. Moreover, New Jersey was just then deciding to protect her steamboating citizens by a resort to reprisal, in a bill which Governor Joseph Bloomfield signed that same year. Thus it was provided that, should any New Yorker, under *his* state law, seize a Jersey boat lying in the waters between the "antient shores" of the two States, the injured Jerseyman had *his* State's authority to seize a similarly situated New York boat. When, or if, his own boat were returned, the Jerseyman must release his capture in good condition. The act followed the theory that each State had jurisdiction to the middle of the river, a point recently emphasized in connection with driving the Holland Tunnel. The colonel, al-

though he foresaw additional competition, looked to this new law to strengthen his position.

Apart from his doubts as to the success of Coxen, the Englishman referred to by Fulton as the reported designer of the proposed Wilmington boat, the colonel was skeptical of this whole letter of Fulton's. It invited him publicly to contradict his own belief that his rights were independent of Fulton and therefore more likely to be protected by New Jersey; it had all of that second-place flavor that was so distasteful; and, while deprecating intrigue, it suggested just that. If he could not beat the Coxen boat on the Delaware, he was certain Fulton could not do it. Indeed, he was so doubtful of Fulton's ability to monopolize even the Hudson that he proceeded with his own plans for a steam ferry at Hoboken.

His petition to "The Mayor, Alderman, and Common Council of the City of New York" for the right to operate such a ferry under appropriate lease was on the ground that "the public convenience will by this means be greatly promoted," and he proposed to accept whatever terms might be "estimated as just and proper." When it became evident that the use of steam would be one of the conditions made by the Common Council, he announced that he would use machinery similar to that in the *Phoenix*. As a stand-by, however, he examined the invention of a certain Michael Morrison—"circular floats attached to a chain passing over horns on the circumference of wheels"—arranging to buy the patent rights from Morrison if these proved worth while. However, since he planned for a seven-knot craft, on twenty horsepower, he soon went back to the *Phoenix* combination. When it appeared that he was likely to get a lease, opposition from the Paulus Hook Company immediately reared its head.

This company had Fulton and Livingston behind it. The chancellor, in one of his periodic moods of compromise, first wrote to Rachel, protesting that, had her husband accepted the original offer of 1808, he would now be in undisturbed enjoyment of the ferry—a very doubtful possibility indeed, as we may now see it. As to Paulus Hook, the chancellor insisted he had lent that company his authority only because Fulton had demanded this of him. He had subscribed but later withdrawn his subscription, and he was by no means certain that he had ever agreed to giving the company exclusive ferry rights. He hoped not, for this would enable him to withdraw his support. On the other hand, he blandly hoped the colonel might be allowed to buy into the Paulus Hook Company, as this would accomplish his own desire "not to injure a family held in such esteem."

It is impossible to guess why Livingston should not have known exactly what steps he and his partner had taken with Paulus Hook and the exact contents of any agreement he himself had made. If he really wanted to compromise, he was doomed to be disappointed. The letter written to Rachel merely annoyed the colonel, and he was not any better pleased by one received within the next few days from Fulton:

Washington, Jan. 10th, 1811

Yesterday, I received a letter from the Chancellor inclosing one from Mr Stevens concerning the Steam ferry boats.

It is now two years since the Paulus hook company have been in negotiation with the corporation [of New York City] during the whole of which time they demanded of the corporation to grant no new ferries from the state prison to the battery and of the Chancellor and me to grant no one permission to use steam ferry boats within the same district without their consent. This I always assented to because I never

knew of your desire to run a Steam boat below the state prison until about 2 months ago.

But, Sir, you have, I presume, seen enough of me to convince you of my readyness to promote your interest by every reasonable means in my power and, as the Chancellor's and my contract is not yet closed with the ferry company, the whole may yet be arranged for their, your, and our interest.

I presume your object in having a steam boat from the Bear [?] market to Hoboken is more to give value to your property at Hoboken than any calculation on profits from the boat. A good ferry boat will cost about $8,000; this, for wear & tear at 12 per cent, is

	$960 a year
It will cost, to run her on fuel and men.....	4,000
Rent of the Bear Market ferry, say.....	600
total expense.....	$5,560

This is for one boat. Again, the distance is so great from the Bear market to Hoboken that the boat could, on an average, not go and return in less than 1 hour and a half; she might perhaps make 7 or 8 trips in a day. You can judge better than I can what would be probable gross receipts, each trip, and, from these, estimate the probable profits. That the prospect of profit is not flattering, I think certain; that it would accommodate the public and give value to your property is certain also, but how is the matter to be adjusted? How can I withdraw my promise to the Pawlus Hook company, of giving them exclusive right to the State prison? There are several modes which may, perhaps, accommodate all parties.

First, that the Pawlus Hook Company, haveing three boats, shall twice a week run one from the Bear market to Hoboken; that is, on market days; and pay you a proportionate rent

for your Hoboken ferry. This would increase your property, accommodate the public, and relieve you of the expense of a boat. Second: That you will not build a steam ferryboat until the Pawlus Hook company clear ten per cent for their capital, after which they will have no right to complain. Then, if you build boats which they consider to diminish their profits, you will, after making ten per cent, pay the Pawlus Hook company one-half the surplus profits; this is the condition they make with me.

I have suggested these modes; others will occur to you, because it is impossible to break down a principle understood for two years, in honor, without substituting something reasonable in its stead.

"Another trap," was the colonel's comment. A trap in which the bait of "rising values at Hoboken" was spread cunningly over the steel jaw of Fultonian control of the Hudson. Paulus Hook boats running now and then to Hoboken and treating it as relatively insignificant? Not for a minute. He preferred to await the result of his negotiations for a ferry lease from New York and to proceed, in the meantime, with his new plan to organize two stock companies —one to run a steamboat on the Susquehanna, the other to operate on Chesapeake Bay.

CHAPTER FOURTEEN

In the hope of arousing the interest of members of the Government in Chesapeake steamboating, the colonel visited Washington, where he wrote to Dr. Samuel Mitchell, then a representative:

January 5th

Business requires my speedy return to New York. I have left in the hands of Mr Fulton a subscription paper with a request to procure me as many subscribers as he can and then to leave it with you. I must beg the favor . . . to put your name to . . . ten shares. . . . Should you not wish to retain them, I now engage to take them off your hands. . . .

Pardon the liberty . . . of requesting your aid in procuring . . . the subscription of such . . . members of your house and of the senate and others as may be disposed to . . . so useful an undertaking. . . . You will probably have it in your power to render me the most essential services. . . . It is needless for me to say how gratefully they will be received. . . .

P. S. Mr Stevens' comp. to Mr Monroe, and would esteem it a particular favor if Mr Monroe would put his signature to his subscription paper for any number of shares he pleases. Should Mr Monroe not wish to retain them, Mr Stevens engages to take them off his hands, either wholly or in part, as he may choose.

Where their interests did not definitely clash, the colonel and Fulton, at rare intervals, still held up the mask of friendliness and even appeared to coöperate. Thus, on the same day the colonel wrote Mitchell he sent a note to Fulton:

I have made several fruitless attempts to obtain an audience with the President. . . . I wish, if possible, to procure

the signatures of the president and vice-president . . . for a few shares. . . . May I take the liberty of requesting your aid?

Two days later Fulton replied:

. . . On Sunday morning, I sent a servant to beg you and Robert to come and dine with me; he returned saying you were gone. In the evening, I got your subscription and proposal, in which I will do all I can to aid you.

Within a fortnight Fulton reported that the President had "adopted the rule of his predecessors, not to subscribe to anything." Meeting "a refusal at the source," Fulton had presumed the heads of departments would feel the same way, with the added reason that their salaries would not bear it. This ended the attempt to secure official investment. The colonel proceeded, however, with advertising his plans in open letters to the newspapers.

It seems [he wrote] to be a prevalent idea that Steam Boats are only calculated for the navigation of smooth waters, than which nothing can be more erroneous. . . . When I first thought of establishing a line of Steam Boats between Philadelphia and Baltimore, before I had taken a view of the navigation of the Chesapeake . . . I must confess I felt somewhat intimidated by the great expanse of water . . . it appeared to contain. When I came to obtain correct information . . . I found this . . . extensive sea was, in fact, the far greater part merely shoals. . . . The ship channel did not occupy one-tenth part of it . . . the ebb and flow occasioned little current . . . [and] the agitation caused by the wind could never produce such a swell as to prove dangerous to steam navigation.

I have also satisfied myself, by an actual survey and taking soundings of the Elk River from Frenchtown to Elkton Landing, that this . . . navigation is perfectly unexceptionable. From Elkton to Wilmington is at present 19 miles, which

distance might, by laying out a turnpike, be reduced to about 16. . . .

Passage from Baltimore to Elkton Landing will always be performed with very little variation as to time. Besides that the tides are very weak, the time consumed on this passage requires part of two tides; so far, then, as the currents each way, during the passage are of equal force, so far are their effects destroyed. . . .

Delaware tides are much stronger but . . . as these boats will draw only 2½ feet of water, advantage may be taken of eddies close in shore . . . behind . . . islands that extend . . . between Wilmington and Philadelphia. . . .

The entire journey between Philadelphia and Baltimore may be performed by this route in as short a time and with nearly as much certainty as it is now done by mail stage. The steam boat will leave Baltimore at 5 o'clock every morning, arriving at Elkton at 3. Passengers will then cross the Peninsula in stages to Wilmington and, starting from thence in the steamboat between 5 and 7 o'clock, will arrive in Philadelphia between 11 and 12. . . . Again, the steam boat will leave Phila. every morning at 10 o'clock, arriving at Wilmington at three. The passengers . . . cross to the other boat at Elkton between 6 and 7, and arrive at Baltimore between 4 and 5 o'clock the next morning. . . . This estimate is justified by the performance of the *Phoenix* on the Delaware. . . .

It appears that the whole journey will be effected in the same time the mail stage takes . . . between 18 and 19 hours. But the difference between these modes of travelling is . . . in one case the passenger arrives fatigued and unfitted for business, in the other . . . unfatigued.

When he learned that the time limited by the postmaster-general for conveying the mail between Philadelphia and Baltimore was not eighteen hours but *twenty-one*, the colonel was more than ever confident of the success of his plan. What others thought of it was suggested by a letter from Fulton.

Washington, January 24th, 1811

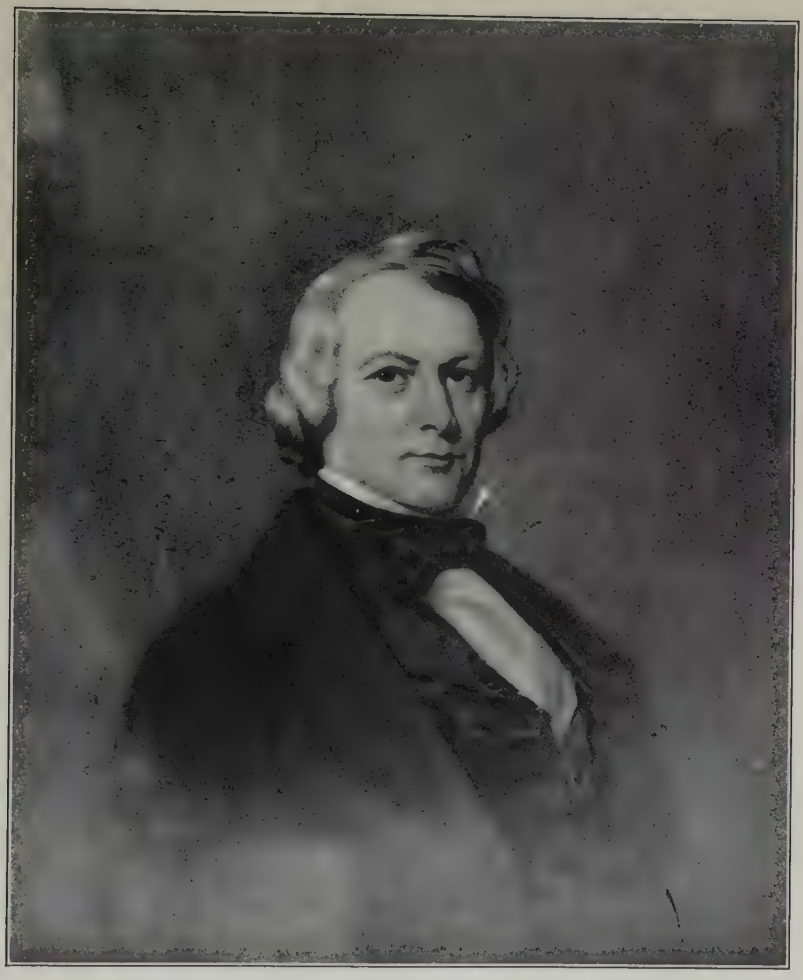
I have had a letter from Wilmington from an old friend, wishing to know your standing in society and whether your Chesapeake project was in danger of being rivaled by me, or if you and I had agreed on this point. He said this information was desired by many persons at Wilmington who wished to subscribe.

I returned for answer everything honorable to your reputation and that you had, by arrangement with me, the exclusive run to Baltimore. Hence I hope you will get many subscribers at Wilmington.

The Albany pendulum geniuses are proceeding with madness in attempts to evade and oppose my patent. Hence we are come to a point when we must lay aside all unnecessary feelings of ambition or originality of inventions, and combine to oppose our enemies. If my patent should, by any unfortunate accident be evaded, which I dont much fear, you of course and all persons working on my principles must fail of every exclusive run. I therefore think that your good policy will be to avow that the leading principles of your Boats are under my patent, and added to this in your Chessapeak boats you have my aid and permission to build exact on my plan. I am certain such notice will be of use in filling your subscription for the simple reason that the reputation of the North River Boats stand very high and will give confidence in the Chessapeak establishment.

In Fulton's letters the colonel always discovered a *quid pro quo*. To avow so much for Fulton's principles would mean belittling his own efforts. Moreover, it was his constant contention that rivals would fail through their own inefficiency without being prevented from even trying their own engines. If these engines, when completed, infringed upon other United States patents, they could be successfully sued. As to the particular instance of the "pendulum geniuses," this was to come up a little later.

Chancellor Livingston, wholly disapproving the colonel's



ROBERT LIVINGSTON STEVENS

idea of a line of boats on Long Island Sound, was little more than lukewarm to the Chesapeake, although he thought this much safer. As he saw it, there would be required another boat to Bordentown, two to Newcastle, and two on the Chesapeake; all these to cost a great deal of money.

> The fact is [he wrote] that I have never received one farthing from steamboats. [With] what I have laid out upon them . . . I begin to tire of all these expenditures, & indeed I have not the means of working with hazardous plans of a boat on the Sound, unless I can get something for our state and patent rights . . . which may doubtless be done without making an advance, as the new state-law affords us ample security against intrusions. . . .
>
> Something *must* be done, because the public is complaining that we will neither exert ourselves nor let others do it, without ourselves or our connections having all the boats.

The significance of the new state law and of public opinion was made a little greater by Brockholst Livingston, in declining the colonel's invitation to become a stockholder in the Baltimore boats. He spoke of the company "forming at Albany to build boats on the Hudson, which must necessarily bring in question the validity of the patents already granted" to the colonel and "other gentlemen." He held that such questions could "be decided only in the federal courts," and added that "it will be thought improper in me by any act of mine to disqualify myself from taking part in the decision of them." This Livingston was not only the chancellor's cousin but also a Federal judge. Obviously, the ethics of the day did not demand of him that, in cases where the chancellor was plaintiff or defendant, he find it "improper" to appear upon the bench. There is record of an injunction or two, issued by him, in favor of Livingston-Fulton.

John R. Livingston, operating the *Raritan*, also suggested that no new boats be built until the Albany case was decided. His point was that Fulton, if he beat these "Interlopers," could buy their boat cheap or let the colonel do so. Still, admitting that "people now have a rage for steamboats," he thought it might be quite safe to build for Newcastle. Should any one else build at Bordentown, he declared, they would have to run a line of stages of their own and also operate a boat from Brunswick to New York. "For," said he, "I am determined to give my captains orders not to admit a single passenger from their boat to cross in mine. This will throw a spoke in their wheel and, if they build a boat on the Raritan [River], I can immediately seize her." From this attitude toward competition in transportation John R. was not to be shaken, although the colonel wrote many letters and sent his eldest son to a special interview upon the subject. As a family the Livingstons were too canny to be drawn into anything that might result in any step toward breaking their monopoly. In considering this, one must distinguish between what appeared to be good business for the moment and what would have been a real contribution to American steamboating.

Public interest was certainly increasing. Captain Moses Rogers wrote the colonel of "a great deal of talk concerning steamboats at present, for it is understood at Trenton that Mr. Fulton lost his suit concerning the North River Boats. They say there is some defect in the Patent Right, and the People have an opinion they can put a Steam Boat on any River they please and make use of any Patent, without any Consent whatever." If this opinion was only half correct, it confirmed the colonel's view that steamboats had "set people all agog" and justified his being strongly in favor of building to reap the harvest. "The proprietor of White Hill

Landing," said he in one persuasive letter to John Livingston, "opened a subscription book and got $8,000 in no time. Mr. Grice of Philadelphia has come on, to know if I will build another boat next season." If so, Grice would subscribe; if not, he and some friends would build a boat of their own. Of their success in this, without any infringement, the colonel was doubtful—but let them try. He was confident that he could build the best and fastest craft on the Delaware, and "it rests with you," he told Livingston, "whether you will build on the Raritan and combine with me to prevent successful opposition." To him all existing craft were crude. Improvements making them better and less costly were bound to come through building. Now was the time to build.

Finding none of the Livingstons in full sympathy, the colonel made public a proposal to build a new boat on the Delaware by stock subscription. For a craft of "100 feet keel and proportionable breadth of beam, with a velocity of at least five miles an hour," the colonel wanted a capital of $25,000. Half interest in the completed vessel was to be his, but this was to be pledged as security to the subscribers, in addition to their owning the other half, and to them was to be paid one half the revenue until they had been reimbursed $12,500, "with legal interest thereon." As to the sound, no progress was made, although the colonel held that opposition to that plan originated in "prejudice, malice, and envy." In his "appeal to the enlightened thought of the citizens of New York," he recalled that "in the infancy of steam, had it been suggested that it was practicable to navigate on the wide ocean with ease and safety, the suggestion would have been thought chimerical; yet it needed but a good boat like the *Phoenix*." A similar craft would meet "the roughness of the Sound," as was shown by "a strik-

ing instance" he gave. "On Monday last, during the violence of the storm, the *Phoenix* came down safely from Bordentown, when two of the Packets were driven on shore and a third obliged to put back. Repeated trials have proved that none of the packets can, in beating to windward, keep way with the *Phoenix*. But when the violence of the wind compels them to reef their sails the difference becomes still greater. No wind whatever has yet stopt the steamboat's progress." However, even this instance was not wholly convincing in 1811; subscriptions came in but slowly and it was not until a year later that a new Delaware boat was built.

An event in the colonel's life was the issue of a second patent to Fulton, dated February 9, 1811, and making the colonel gasp with astonishment when he read it. In addition to repeating his basic claim to the right to build long, narrow craft, Fulton made assertions which startled all concerned.

I claim, as my invention and exclusive right, the *combination of a steam engine with sails to drive a boat*, I being the first who have done so and proved by practice the utility of the union of the two powers of wind and steam. Hence, as a boat may be rigged a variety of ways, *my invention is not for any particular rig, but for the discovery and proof by practice of the importance of using sail with a steam engine to drive a boat. . . .*

I claim as my invention, to place the tiller or steering wheel, and pilot and steersman, further forward in steam boats than is usual in other vessels; the necessity of which is, that, the boat long and the deck crowded with passengers, the pilot could not see forward unless near the middle of the deck. *Hence, anyone who moves a steersman further forward in a steam boat than is usual in other vessels shall be considered as using this part of my invention in the convenient arrangement of steam boats.*

Others than Stevens were staggered too. Before the patent was issued, Thornton had written Fulton: "I cast my eye accidentally over your claim to rigging a steamboat with sails. I had one rigged schooner-fashion in the year 1792. The idea in the conclusion of your explanation, of restraining anyone from building a long boat, is unworthy of you or of my objections." In a letter to Benjamin Say, another former partner in Philadelphia, Thornton declared that "Mr. Fulton is for engrossing not only all the profits but likewise all the honors of the invention of steamboats." In fact, the whole Thornton correspondence is full of such excoriations of Fulton as "an imposter" as Colonel Stevens never permitted himself. For his part, although he never conceded to Fulton a monopoly of *invention*, he often openly spoke of the *Clermont* as "the first *useful* steam boat," by which he meant the first vessel run as a useful, commercial proposition. Where credit was due Fulton, the colonel was quite sportsman enough to pay it; but he found the patent in question an exceedingly difficult mouthful to swallow. The "long boat" was certainly the "property" of any one; the so-called "Durham" boats, for instance, were in constant use and built in just the ratio of length to beam that Fulton claimed as his invention. The claim of any individual to such a ratio was quite untenable; Fulton's merely served to make negotiations with him still more difficult. This the colonel discovered when he took up with the monopolists, by letter dated February 28, 1811, the matter of his new ferry-lease from the city of New York:

I have obtained . . . a lease, from the Corporation, of the Hoboken Ferry for the term of fourteen years on condition of putting a Steam boat on the ferry in two years. I am ready to make you any compensation you desire for your patent

right, &c. I therefore trust you will not put it in the power of any Company to defeat the good intentions of the Corporation for the public accommodation, besides involving me in a litigation which, terminate as it may, cannot benefit you but may prove ultimately very injurious to the establishment of your rights. It is unquestionably in your power to settle this business yourselves. At all events, I am fully determined to make no arrangement with the Paulus Hook Company.

The lease was dated February 5. A few weeks later the Paulus Hook Company also obtained a lease, in their case covering only the ferry from the foot of Cortlandt Street to Jersey City. Thereupon it became a race to see which ferry should have the first steamboat, and in this connection the colonel wrote to Robert:

I am at present in great want of your assistance here; before I proceed too far with the engine for the ferry-boat, I wish to have your advice about the arrangement of the machinery. The keel, stem, stern, and floor timbers are already laid, and the boat builder promises to have her finished by the beggining of May. If, therefore, you can safely trust the boat to the management of the Captain and James Lee for a short time, I wish you come on immediately on the receipt of this.

With Robert's frequent help the work progressed at top speed and finally brought the colonel out the winner of the race. Early in the fall the new craft was christened *Juliana*, in honor of the little twin-screw boat of 1804. The ferry authority from the New York Corporation had been sublet to David Godwin at $1000 a year, with the proviso that "the said Stevens and his family pass and repass, ferriage free, during the term." On September 18 Godwin's advertisement appeared:

Mr Godwin respectfully acquaints the citizens of New York and the public at large that he has commenced running a steam

boat on the Hoboken Ferry, of large and convenient size, and capable of affording accommodations to a very extensive degree.

The boat moves with uncommon speed and facility, and starts from the usual ferry-stairs, at the Corporation wharf, foot of Vesey Street, New York, where passages can be taken at any hour.

After so many years of effort on the Hudson, it seems entirely fitting that the colonel's craft should have started the first regularly running steam ferry service in America—the first in the world, for the matter of that. True, the modern *Buffalo* or *Hopatcong*, of a still more "large and convenient size," might be able to hoist the *Juliana* in on deck. For all that, they and the other members of the fleet that shuttles ceaselessly across the river are only following the courses she originally set. For a season or two she was to be unmolested. Proud of her, the colonel had invited New York's Common Council to make a special trip of inspection. The council minutes for Wednesday, October 11, bear this entry:

A report of several members who, on the invitation of John Stevens, Esq, crossed the river in the Hoboken steam ferryboat, expressing their appreciation of the same, was received and ordered to be filed.

Press comments were similar to one in "The Columbian":

Steamboats are rapidly getting into the full tide of successful experiment in this country. Last week, one of Col. Stevens' ferry-boats, employed by Mr Godwin, of Hoboken, was started into operation, and yesterday made 16 trips back and forth from that place to this city, with a probable average of 100 passengers each trip.

Her machinery, we understand, is somewhat different from that of the North River boats, and we presume she sails con-

siderably faster than any other heretofore constructed in our waters.

Speed was the most gratifying element in the success of the *Juliana;* nothing so pleased the colonel as her being able to double Fulton's estimate of "7 or 8 trips in one day." Whenever opportunity offered, the *Juliana* was given a brush with anything else on the river. One such race, after she began her season of 1812, was described in "The New York Evening Post":

On Wednesday, the *Hope* started at her usual hour of 5 o'clock P.M. for Albany, and was met as she passed the Corporation Wharf by the *Juliana,* the little steam Ferryboat plying between Hoboken and this city. But as the *Hope* then made a stop to take in some passengers, the *Juliana* sheered out into the river to prevent her getting too far ahead of the *Hope;* and when the *Hope* again got in motion, the *Juliana* was ahead of her perhaps 50 yards. As the tide was running down very strong, the *Hope* kept in as close as she could to the wharves and, getting into an eddy tide below the Fort, whilst the *Juliana* was running in the strength of the current, the *Hope* gained very perceptibly on her antagonist, so that when the *Juliana* got opposite the Fort, there were not 30 yards between them. But this was a very short-lived triumph; for, the moment the *Hope,* in passing the Fort, began to feel the influence of the ebb tide, she lost ground and, by the time the *Juliana* had reached the lower end of the wharf at the State Prison, she was not less than 250 yards ahead of the *Hope.* The distance between the Fort and the lower end of the State Prison Wharf does not exceed one mile. To gain 220 yards in the distance of one mile is certainly very good going, especially when the great difference in the lengths of the two boats is taken into consideration, and prove very decisively that there must be a great superiority in the construction of the machinery on board the *Juliana.*

But, as the *Juliana* now not only reigns victorious on the waters of the Hudson, but may be said to have even distanced

the triumphant *Hope*, the lovers of the sport will probably not very soon be gratified with any more Steam Boat races.

Apart from racing, the *Juliana*, during the time she was permitted to run, had good success in service. One season's receipts were set down as $4308, with an item of "$210 for a thousand cattle." As an encouragement to passengers, the colonel, with the assent of New York, erected a new dock and floating stairs opposite the old Washington Market. He was out for every possible success at this moment, because his eye had just fallen upon a new figure, rapidly growing into the shape of another steamboat competitor—no less a personage than Colonel Aaron Ogden, former *aide-de-camp* to Hamilton and distinguished for such Revolutionary services as leading the assault at Yorktown. From Perez Rowley of the coach lines the Colonel got wind of Ogden's plan to run stages from Bristol to connect with the *Phoenix* and the *Raritan*, but more complete information came at first hand in a communication showing a singular distaste for the first letter in the alphabet:

March 11th.

I do not expect thet my steem Boet will be reddy to run before the first of September next, but as she is now actuelly begun, I have been anxious to see or heer from you, on the subject, in order thet we may come to a perfect understending.

I ought not to, neither cen I have eny motive for opposition to your Boet, but on the other hend, I heve, *personelly*, the strongest wishes thet you should derive all thet profit therefrom which, in my opinion, you so highly merit. My neturel, & only aim, is to esteblish by Elizebeth Town Point and, from a steem boet there, to a steem boet on the Delewere, easy, cheep, and daily communication between the cities.

Confiding in the decleretions which you heve mede, thet your Boet should join in any suiteble arrangements therefor, whenever a Steem Boet should be established at the Point, & thet

your Boet in thet case, if not sooner, should run daily up and down the river, I heve not, since I hed the pleasure of seeing you with Mr McIlvaine, progressed in any measures on the Delewere, witing for your ultimate conclusion on this heed, considering thet none such has yet been made.

In respect to steges, I have made an arrangement, already, for one single line only, reserving to myself the esteblishment of such further lines as mey appeer proper. This line will be reddy to start as soon as an arrangement cen be mede between a Steem Boet from the Point & a Steem Boet on the Delewere, or perhaps sooner if you shell, in the meentime, find it to your interest to run daily up and down the river from eny place you mey select at eny hours.

Be assured, Sir, thet I have no other wish, then thet you should give to the subject the consideretion thet it deserves, and if you should find your interest, which I sincerely hope you may, in promoting these contemplated arrangements, so far as mey concern your Boet, it will give [me] greet pleasure.

No definite arrangement to meet Ogden's stages appears to have been made. It hardly could have been made, because the colonel and Robert, in view of Ogden's new steamboat, were pushing fresh efforts to make the *Phoenix* too fast and too comfortable for any competition on the river. Robert spent the whole spring in making improvements, most of which he reported to his father.

I am altering the passage, from the kitchen to the cabin, to the other side of the boat; which will, by fastening the gangway in front, prevent strangers from going to the engine. . . . The gards in front of the wheels are finished . . . made of oak 13 inches deep and 5 inches thick at top, for 4 inches, then chamfered away on the inside to 2 inches at the bottom. . . .

I would have written yesterday, but the coppersmith was at work on the crooked pipe in front of the boiler and, as he confessed he did not understand this kind of job-work, I was afraid to trust him alone with it, for fear of spoiling it, which

would have obliged me to go to Philadelphia for another. . . . I was obliged to discharge the coppersmiths we got from Trenton, as they did not appear to know anything beyond making a shell or tea-kettle. . . .

The engine never worked so well before; it made from 22 to 25 strokes per minute. The pressure varied from 4 to 9 pounds per inch. The cylinder is well covered with carpeting which is surrounded with canvas, tight-laced and painted. The trembling of the boat is trifling to what it was last year—strapping the large knees that support half the weight of the wheels, with iron, has stopped the vibration that was felt over the whole boat.

The colonel's reply was one of the few letters of which he made no second draft. "Preserve this carefully" was the admonitory postscript he always added in such cases, and Robert was particular in doing as he was bid.

April 7th

. . . Your account of the success of the several improvements has gratified us all very much. Had you, however . . . suffered the feed-pipe, as I proposed, to have entered 5 or 6 feet into the cylinder [drum] the noise would have been prevented and we should still have the advantage of introducing cold water into the lowest part of the boiler. . . .

From what you say of the trembling . . . I should suppose the passengers who were in her last year would be forcibly struck with the improvement. . . .

You can inform the land-line that I have no objection to the arrangement . . . respecting the fare of Lines 1, 2, & 3. As to . . . South Amboy . . . I leave it to you. . . .

As to the plan of running the passengers no further than Princeton, it meets my entire approbation. . . . If they have a just idea of their true interest, no one of the concern [stagemen] but Shuff could possibly be opposed. It would obviate completely the difficulties we had last year. All night work would be avoided, except when . . . [*Phoenix* or *Raritan*] have an uncommonly long passage, and little or no time would

be lost on the whole passage. . . . Of more material consequence to us is [it] that passengers would have no motive for quitting at Trenton, which they frequently did last year, whilst others were deterred . . . from fear of night work between Trenton and Bordentown [on land], as the road was represented to be dangerous. Whilst we continue to run through, we have little or no chance of picking up way-passengers, either at Trenton or Princeton, as very few would be induced to subject themselves to the inconvenience and expense of being a night on the road and travelling a bad road in the dark. . . . By this arrangement, nearly all the passengers from Princeton and Trenton would prefer the steamboat route. . . . Starting from Bordentown at 8, instead of 7, more time would be allowed . . . people from the country to come in. . . . A great thing for Rowley and I should suppose Gulick would be in favor of it. . . .

Mr Fulton has at last found out that my patents will be of great value to him in his suit against the Albanians, and he yesterday had the modesty to request me to make him an assignment of my patent in toto, he re-conveying it to me after the suit is determined. But—two words to that bargain! . . .

J. S.

P. S. I wish you would say whether you want Jackson and his wife. He wishes to go as cook. Yours, Rachel Stevens.

The assignments of patents were wanted by Fulton in what has already been referred to as the suit with the "pendulum geniuses," whose boat was the *Hope*. The colonel told Fulton such an assignment was "totally inadmissible," but added that should he "conceive it will be of any service" he might use the colonel's name in the proceedings. As a matter of record, Robert was called as an expert witness upon the similarities and differences between the Albany craft on one side, the *Clermont* and *Phoenix* on the other. So strong was Livingston's New York position that he was allowed to confiscate the *Hope*, which he had done when she

had her race with the *Juliana*. The case was a test one, serving to reaffirm the monopoly's hold upon the Hudson.

While it was in preparation and in progress, the colonel was pushing his plan for boats to Baltimore and between Wilmington and Philadelphia. In the Maryland city he published an estimate of the probable revenue and the prospects for success.

> The average number of passengers pr. diem going thro' between Philadelphia and Baltimore cannot be estimated at less than 30 each way. Between Philadelphia and Wilmington, not less than ten, making in all forty each way.
>
> 80 passengers at, say, $1.25 each, $100 pr. diem. Expenses, say $25, leaves a clear revenue of $75. . . .
>
> The Boat, say, runs 280 days. This gives $21,000 per annum . . . on a capital of $25,000, equal to 85 per cent. . . .
>
> Steam Boats have been found . . . so easy and agreeable a mode of travelling that . . . the effect has been to increase . . . travellers to a surprising degree. In addition . . . the rapid increase of population and wealth, daily taking place . . . will probably, in a short time, more than double the number. . . . The two steamboats between New York and Albany will this season clear $50,000. . . .
>
> It appears that a company is formed . . . for running boats on Lake Champlain. . . . A Steam Boat Line would thus be formed from Montreal to Baltimore, 600 miles, with less than 100 miles of land carriage.

In making his appeal to Philadelphia, the colonel "gave a loose to language." Apparently, civic pride was the big factor in that city's progress, for it was this that he strove to reach. But he first gave the citizens a picture of the possibilities of steamboat travel:

> If we view this important invention philosophically, we must be led to anticipate the most happy effects. It is calculated in the most eminent degree to promote an unreserved and free

intercourse among persons of every description in society. The lawyer, the physician, the divine, the merchant, the farmer, the mechanic, the Belle and the beau, the serious and the gay, all meet on board a steam boat. The opportunity and facility afforded her for social intercourse is nowhere else to be found. Freed from the restraint and pomp of formal parties, a happy flow and interchange of sentiments prevail, so congenial to our republican institutions. Our time while on board may be profitably and pleasantly spent, in reciprocally giving and receiving instruction and amusement. Thus will this delightful mode of travelling have a powerful tendency to enlighten the understandings and to polish and refine the manners of our citizens. For this ingenious and highly useful invention we are indebted solely to American genius. . . .

We are now, as it were, just rising from the imbecilities of childhood to an astonishing display of vigor and energy in every walk of science and art. To give only a single instance, the medical school in this city at present consists of upwards of 400 students. The architectural improvements daily arising and soliciting our attention as we pass thro' every part of this flourishing city are truly wonderful. Let us not, then, in this rapidly advancing state of a career so truly noble, incur the disgraceful opprobrium of suffering the further extension on our waters of this useful invention of Steam Boats to depend for its completion upon foreign aid. Shall it be said that the apathy and want of public spirit amongst us is such that, to effect the useful and laudable purpose of facilitating the intercourse between this city and the city of Baltimore, we are to be indebted to the citizens of New York? No! Let every citizen who can conveniently spare $50, come forward and subscribe and insure to himself the enjoyment of the pleasing reflection of having contributed his mite towards the accomplishment of an object so highly useful and honorable to his country.

Fulsome, perhaps, but not at all a bad forecast of the familiar rush-season on to-day's liners. To the colonel—and to his *alter ego*, Robert—there was no limit to the possi-

bilities of transportation. Let Fulton express, as he did, nothing but a widely held opinion when in this year he wrote Thornton that he "could not see by what means a boat, loaded with 100 tons merchandise, can be driven six miles an hour in still water." The colonel, convinced that he knew better, read the chapter on what had already been accomplished as the mere introduction to the history of steam navigation.

In the closing weeks of 1811, war with Britain became imminent. The nation, in the phrase current at Washington during the last war of 1917, was in "a delightful chaos of unpreparedness." Reflecting upon this, Colonel Stevens conceived a new use for some of his acres and made a proposal to the President.

December 30th, 1811

The Great importance of the subject . . . must be my apology. . . . A bill respecting the naval establishment has been reported in the House. . . . Among other things, it is provided that money be appropriated for the purpose of establishing a dock yard in such central and convenient place as the President . . . may designate. . . .

An inspection of the map . . . will shew at once the superior advantages of the port and harbour of New York . . . as a site for a public dock-yard. . . . It will . . . become a question of much importance to designate the particular spot. . . .

In a conversation I had a year or two ago with Colonel Williams, he . . . finally concurred in [the] opinion that Hoboken was in every respect the most eligible position, both for a dock-yard . . . and for a safe and accessible harbour for stationing ships of war. Permit me, Sir, to state some of the reasons . . . [for] a preference . . . to the present position . . . at the Wallabout.

With respect to facility of access there . . . is no comparison. . . . From the extreme rapidity of the tides in the East River—the narrowness and crookedness of the channel, and the multiplicity of vessels constantly passing—there is always more

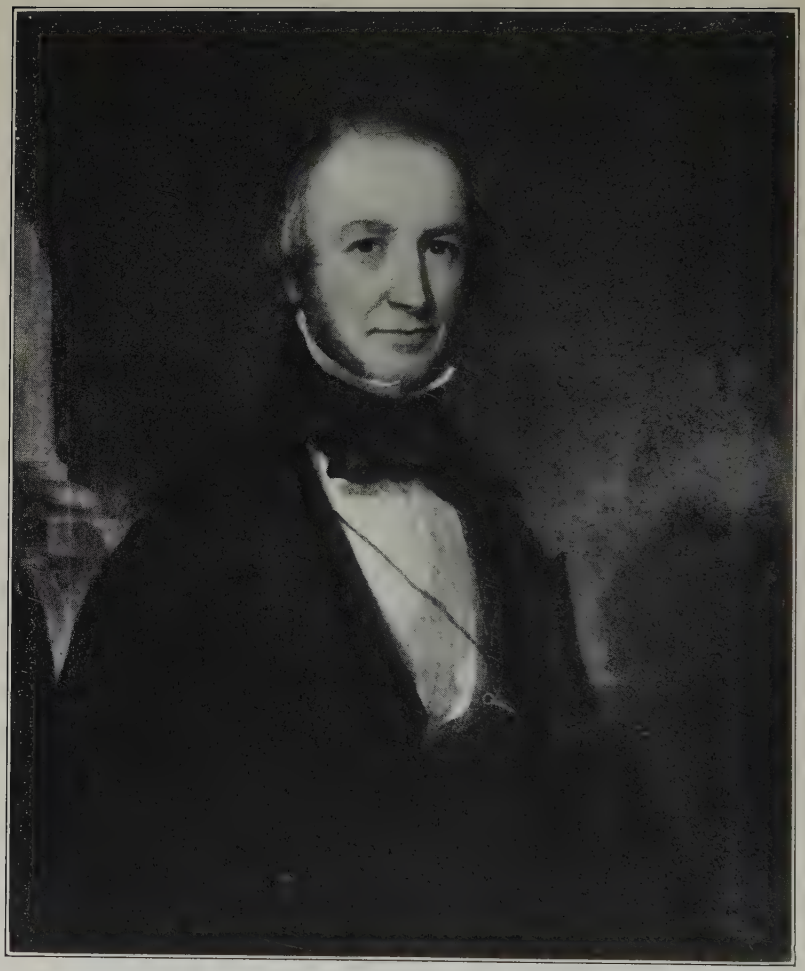
or less detention . . . and frequently danger, passing in and out. . . . When the wind blows from the west—a fair wind for going out the *bay* to sea—vessels are frequently detained for days or thrown on shore. . . . During the winter these difficulties are much increased. . . . During severe frosts, there is frequently an interruption of navigation . . . for weeks. . . . The ice, coming down the Hudson is forced to the eastern shore, and the flood . . . making up the East river an hour earlier draws this ice up with it. From [all this] Hoboken is almost totally exempt. . . . The navigation . . . can never be interrupted by ice, except for a few hours at a time. . . . The Hudson River being completely frozen over as low as Hoboken . . . is so rare . . . that for a century it has happened only twice—in the winters of 1740 and 1780. Westerly winds prevail and drive the ice over to the opposite shore. . . . A clear passage is left to come in or go out. . . . So wide and safe is the channel that a ship of any size can always beat out and in against a head wind. . . .

This is of importance . . . in obtaining supplies of timber and other naval stores. The timber coming . . . down the Hudson can be deposited in rafts . . . whereas to the East River . . . the constant practice is to break them up and take them round in detached pieces. . . .

Hoboken is an Island consisting of about 300 acres, surrounded on three sides by water and connected the main land by a salt marsh half a mile in width. The commanding eminence of Castle Point, near the middle of it, and the facility of obtaining succour from the City of New York, must ever insure it's safety against . . . attack. . . . The bank in front of the river . . . is sufficiently elevated to furnish ample material for filling wharves, &c. . . . By sinking some blocks off the Point, an effectual protection against the ebb ice may be made, and any number of ships may be safely moored inside these blocks . . . in readiness to go to sea. . . .

At a distance of a quarter-mile from shore—by a very gradual slope—the depth of water does not exceed 40 feet. Capacious basins for the reception and storage of timber are already found and may be enlarged to any extent. . . .

Colonel Williams . . . has acquired . . . a correct knowl-



JAMES ALEXANDER STEVENS

edge of the port and harbour. . . . He has it in his power to furnish the most authentic information.

Beyond an acknowledgment from the secretary of the navy, no action was taken. In the national emergency the colonel, if he had not presented part of Hoboken to the Government, would have sold it—or leased it—at a figure which would now be ridiculous. Had the navy yard been established there, the disadvantages to private commerce would be obvious. On the other hand, there would not exist the present dishonorable situation in which the Hoboken docks—commandeered with perfect propriety as a war measure of 1917—remain, without a penny of payment, in the possession of the Government as a base for its operations in competition with private shipping firms. Colonel Stevens's plan might have prevented this. What he would have said of it to-day may be guessed from what he said in 1795 about the failure of Congress to provide for redeeming Revolutionary paper money: "The reasons they assign, in support of this, appear to me frivolous and irreconcilable to principles of common honesty!"

In considering the "bold eminence" upon which his house stood, the colonel always thought of this as an American Gibraltar. When Juet's "White greene cliffe" came to be called Castle Point, the name was really a corruption of the colonel's earlier term—the Point of Castile. After a discussion with Jonathan Williams of its possible use by the nation during the war of 1812, the colonel wrote without enthusiasm:

It will readily occur to you that the occupation of the grounds in front of my country residence, as a fort or garrison, would affect very much the value of my property. . . . It will not appear surprising that I should acquiesce in the meas-

ure with reluctance. . . . But, as you conceive this position of some importance . . . I am induced to make . . . the following proposals:

I will convey to the United States . . . immediately in front of my dwelling house . . . a semi-ellipse of nine hundred feet in front and two hundred and forty feet diameter . . . with the liberty of a road or passageway . . . down to a landing where the bathing-house stands at present. Also, a piece of land adjoining on the north side . . . extending . . . one hundred and twenty feet; thence, at right angles, to the brow of the hill. . . .

1st In Fee Simple, for $10,000

2nd Lease for any specified term for $8,000

3rd Lease for an annual rental of $1,000, with $2,500 premium in advance.

Much as I am attached to a spot, in the improvement of which I have spent so much time, labour, and expense, . . . I should prefer disposing of my house and the ground about it—say, five to twenty acres—at a fair valuation. . . .

The little-navy policy of the day made it evident to the colonel that much of the fighting would be close to shore if not actually on land. This naturally led him to the consideration of the problem of getting troops from point to point. The *Phoenix* was demonstrating the possibilities of steam to the proprietors of the old Union Line of Philadelphia, Newcastle, and Baltimore packets; with these gentlemen the colonel entered into a preliminary agreement. He had already pointed out the dreadful condition of the roads between Philadelphia and Wilmington, declaring that water transportation would be far more comfortable and hence more popular. To make connections with the steamboats, he suggested that a turnpike be built from Elkton to Wilmington, thus reducing the land-carriage in distance and providing for considerably greater speed.

MacDonald & Son, Henry Craig, George Hand, Levi

Hollingsworth, and James Le Fevre were among those who were associated with the colonel. As announced in the papers of January 18, their contract provided that the boats should be run under the patents of both Stevens and Fulton, and warned off violators of either. Emphasis was laid upon the fact that the proposed line would result in steamboats "from Albany to Baltimore, a distance of 350 miles." Mechanical specifications for boat and engine covered a craft of 130-foot keel and 20-foot beam, with an engine of 28-inch cylinder and a boiler "sufficiently large and strong to keep up the steam to 8 pounds on the circular inch." The shares, at a hundred dollars each, were a thousand in number. For many years to come the Union Line, afterward transferred to the Hudson, would remain a great Stevens interest.

With the same George Hand the colonel made a preliminary arrangement to build a steam ferry across the Delaware at Philadelphia, only to be greatly disappointed when the necessary funds were not immediately subscribed. Horace Binney, as usual, was the representative through whom he urged that a more definite contract be executed. In midsummer he wrote to Binney:

> The ferry boat now plying between Camden and your city is by far the best and approaches nearest to mine. But, to prove her great inferiority, it need only be stated that, with an engine of the same size and with the advantages of greater length, her velocity is much less than that of the *Juliana;* whilst the consumption of fuel is nearly double. In the construction of another ferry-boat, I should make considerable improvements, as I have improved upon the *Phoenix*. . . . As there are three or four ferries across the river to your city, the ferry which could obtain an exclusive right to my machinery would have a great and manifest advantage. . . . These circumstances may be stated to Messrs Hand, Negus, &c.

Livingston's figure of the proved steamboat as "the egg stood on end" was an apt one. It was apparently the opinion of the good Philadelphians that they could proceed successfully without either Stevens or Fulton. A designer somewhat indefinitely known as "the Englishman Coxen" persuaded many to join in his enterprise, with an engine which at first appeared to be an infringement upon the *Phoenix*. Later, instead of bringing suit, the colonel concluded to save his money for a new fast craft and make with her his bid for the increasing trade. For the present the Delaware ferry might get along without him.

The new boat was contracted for with Nicholas Van Dusen, the shipwright of Kensington "in the Northern Liberties of the City of Philadelphia." Before the end of this year (1812) she was finished with "One main deck, flush fore and aft, a hundred and thirty feet six inches in keel, twenty-one feet beam, and seven feet eight inches depth from the floor to the underside of the beams." In addition, she had other features.

> . . . Masts, bowsprits, topmast, yards and capstan, with a figurehead at bow and carved work on the stern. Stanchions and hand rails of oak. . . . Seats, where required on deck . . . supported by wrought iron cranes. . . . Two kelsons the whole length of the machinery, 2½ feet high. . . . Hatch over the boiler, covering the machinery. . . .
>
> The ladies' cabbin . . . furnished with curled maple pannels and doors, the seats and surbases of mahogany, and the whole varnished. Two tiers of berths across the forward end of the cabbin, a water-closet on one side and a closet with shelves on the other. The main cabbin . . . finished in a handsome stile, with a berth at each side in the stern. . . . A Bar . . . fitted up with shelves, draws, &c. . . .
>
> The kitchen with two double berths . . . and fitted with shelves. . . . Sealed on top and sides, with a double parti-

tion between it and the ladies' cabbin. . . . The forepeak fitted with berths for the hands. . . .

Staircases with hand-railings down into the main . . . and the ladies' cabbin. . . . Windows in the cabbin five or six feet asunder, thirty inches deep by twenty-two wide, with blinds and sashes of four lights each. Small windows on each side of the machinery. Windows in the stern. The sides and top on each side of the machinery, sealed. A small skylight in the kitchen and patent lights in the gangway. Steps from the deck . . . to the machinery. . . . A patent rudder. . . .

A Hogshead of rum, furnished by Stevens at the launching.

Such was the *Philadelphia*, soon to be affectionately known up and down the river as "Old Sal." A partner in building her was Major Theodosius Fowler, secretary of the Cincinnati; a family connection since his daughter Maria had married James Stevens. In design the ship was largely Robert's, whose pet and pride she became. It was in her that he first introduced the method, afterward generally adopted, of replacing nails in frames and planking by stout bolts; in her, too, he inaugurated the custom of installing stiffening knees of wood and iron, inside the frames—a great advance in overcoming that shattering vibration from which all early steamboats suffered. As to general equipment and appointments, he was determined that she should outshine every rival. "I hope," he wrote home from Trenton, "that Mama will be able to get the china in New York, as she is a much better judge than either the Capt. or myself, and would get it cheaper. If she cannot, I wish you would let me know, that I may get it when I go down." When Rachel had carried out this commission, Robert was concerned that she should "have it well packed before she sends it, as the roads between Trenton and Brunswick are very rough." Meantime, he himself "purchased the table cloths, tables, and glasses" and hurried the work of making curtains for the

cabins until he could report that these were "to be finished so as to come on Friday." Completed, the new craft gave him a speed of eight miles an hour and very soon took her place at the head of the procession of Delaware steamboats.

CHAPTER FIFTEEN

The Hudson and the Delaware had become object-lessons for sailormen. Among the old-timers who read the signs correctly was Elihu Bunker, known as a hard driver of sailing packets, but a tactful man in his appeal to the colonel for a berth as captain of the *Phoenix*. "I am anxious," he declared, "that your line (the only proper one, in my opinion, that can be on the Delaware) should be managed with Honor to the Proprietors and the Establishment. In order to have the reputation of the Boat well established, she must have an Expensive Steward and Waiters." He wanted to work for such a line, but, "since the dinner apparatus, breakfast and Tavern must be at my expense, I cannot accept less than $1000 a year." At this figure, the colonel might "depend upon his Exertions to promote the Interest of the Line as far as lay in his power," while he would also "take care of the boats during the winter season when they are not running." The colonel, however, would not pay more than $600, for which he secured the services of a certain Captain Abisha Jenkins on the *Phoenix*.

Another captain employed at this time was George Abbott of Trenton, engaged by Robert to superintend a work which he had himself begun about a year earlier and would for some time continue—dredging the Delaware. Since this river, like the Hudson, formed the boundary between two States, the colonel held that both Pennsylvania and New Jersey should be consulted. Both, perhaps, might help him with appropriations. Authority to proceed was not difficult to get from New

Jersey, although Governor Bloomfield wrote the colonel that an accompanying bill for a state lottery to provide funds had failed in the legislature. Pennsylvania was less amenable when the colonel, through William J. Duane, offered his petition and his bill. Co-signers with their father were Robert and James, in a long explanation of the project. The removal of the bar at Periwigg Island, they declared, "could not fail to be advantageous to a very large proportion of the Commonwealth, who are interested in the transportation of produce, lumber, or coal upon the Delaware to the market at Philadelphia." If the channel were cut, as proposed, four feet deep and sixty feet wide, "all persons descending the river from above the Falls of Trenton, or ascending above the Falls, would be greatly benefited." Under these circumstances, it appeared to the petitioners entirely fair that, in return for opening the channel and keeping it open, they should be granted an "exclusive privilege."

What the colonel wanted was the sole right to carry passengers by steamboat to and from points between the bar and the falls—a distance of about three miles. This, he admitted, would amount to an exclusive privilege to carry travelers between New York and Philadelphia because, the channel once opened, all would prefer his route. But he offered what he held to be good reasons why this would not result in "destroying the competition now existing on the river."

> Although seven or eight steamboats, at different times, since the memorialists first introduced them on the Delaware, have been employed to carry passengers to and from Burlington, Bristol, and Bordentown, not one . . . except those of the memorialists, have ever passed the bar above Bordentown. Their owners have found it advantageous to confine their car-

rying to points below. So there will be no greater competition by suffering the bar to remain than by removing it. . . .

A turnpike road has been made between Bordentown and South Amboy . . . which makes the whole route twelve miles nearer through Bordentown than by Trenton and Brunswick. In addition, a steamboat is engaged to ply between South Amboy and New York. These circumstances give the route through Bordentown such advantages as may destroy the Trenton route unless the bar is removed. By steamboat to Bristol, thence to Trenton by land, has gained a great accession of strength. On account of the frequent interruptions for want of water at the bar, town stages have been established from Trenton to Bristol, which have more than divided the business with the steamboat. Even if the bar be removed, the distance from Bristol to Trenton by land is only nine miles, by water, fifteen.

With regard to "goods or other commodities" carried in the steamboats of others between Trenton and the bar, no restriction was asked. The colonel wanted "no undue advantage . . . and would be highly gratified if the two states would, at the expense of the public treasuries, relieve him of opening the bar and keeping it open to all steamboats." Failing the possibility of such action, he still believed that much public good would result from dredging; if he did the work, he should, he felt, be allowed this privilege as compensation. That the State of Pennsylvania did not agree with him is evident from the fact that her records do not show any action taken upon Duane's bill. The colonel went ahead without it.

A dredging machine was brought down from Philadelphia and it was this that Robert turned over to Captain Abbott, who reported progress to the colonel direct.

In my last I informed you that we had commenced opening the Channel . . . by Ploughing, &c, with prospects of procuring Colver's [?] machine from Philadelphia. . . . We have

accordingly got it up. It requires 5 or 6 men to work it. In the soft surface, the scoop filled the 1st stroke, but, the harder places, 2 or 3 strokes were made before the surface could be broken. Tho' it appears to move slowly, it is certain in the effect. I think there's a fair prospect of opening the channel 15 or 18 feet wide thro' the whole of it by November —provided our money holds out. We shall continue to work with our horse-scoop on the second or middle bar. The expense of Colver's machine is five dollars for each day she is worked.

The machine [runs a later report] sank a number of times and produced a great deal of trouble. At last we got her tight and opened to a good depth on the upper flat. We raised and took away a number of large stumps and several long trunks of trees. . . . A bar at the end of Periwigg remained to be done.

We were moving the machine to do it when the cold suddenly came on, so as apparently to render it necessary to put the machine in winter quarters. The owner had previously demanded that, when done, we should return her to Philadelphia.

The other machine (horse) is too small. I wonder if your son could not construct one that would answer as well or better.

Robert could, and did. His shovel, or scoop, was one of the many designs he made to meet some emergency, and it was never patented. Abbott had it in operation during the next season until, one day, the barge grounded; whereupon, to Robert's intense indignation, Abbott quit work and paid off all the men. Hiring new ones, Robert himself proceeded. Lamberton sloops frequently fouled the barge—deliberately, Robert contended, in order to claim damages. To get the better of them, he changed the method of anchoring, so as to leave more room, and then urged his father to sue every sloop that thereafter rammed him. To accommodate the passengers who objected to the temporary use of small boats to carry them over the shallows and alongside the steamboats,

he built a long dock. By overcoming such obstacles as he met them, Robert finally had the channel dredged and serviceable. He thrived on obstacles.

While the *Philadelphia* was building, the colonel's time was enlivened by a brisk interchange of letters, begun by Fulton on October 27, 1812:

I have just been informed by Mr Stoudenger that your foreman, and with your knowledge, has been endeavouring to entice some of my workmen, who have gained experience in our shop, to go to work for you at Hoboken. I hope this is not true. But if so, and one man moves from my shop, even by his own voluntary act, I shall instantly insist on all the rights to which I am entitled in law & justice, and which have been encroached on in a manner that cannot be maintained.

In his reply, dated the same day, the colonel was no less crisp:

Your letter of this date is couched in terms so very offensive that I should not have deemed it incumbent upon me to have returned an answer, were it not that it is necessary and proper I should be informed explicitly what you mean when you say "I shall instantly insist on all the rights to which I am entitled in law and justice, and which have been encroached on in a manner that cannot be maintained."

When I tell you that I have no knowledge of the circumstance you mention respecting your workmen, be assured, Sir, that the very indecent threat contained in your letter has not, nor ever will have, any influence whatever on my conduct.

At this, Fulton became slightly more explicit:

That your foreman, or someone else working under you at Hoboken, did attempt to entice some of our workmen away, is a fact; and, I was informed, with your knowledge; hence my letter was a conditional one that, if by your knowledge or concurrence, I should insist on rights you have infringed.

Your letter appears to imply that you have not encroached on my rights. It is time, however, that point should be settled by our counsel. You are running a steam boat without a license from my partner or me. When that boat was talked of, and long after the Paulus Hook was formed, the most which was contemplated was to carry foot-passengers. But horses, gigs, carriages, and cattle are carried, to the injury of the Paulus Hook Company, and in contempt of my United States Patent and Livingston and Fulton's State Grant. These, Sir, I believe to be encroachments which cannot be maintained in law.

My letter, although conditional, seems to have given you some offence. Your letters, last winter, to Mr Boyd, making yourself inventor of steamboats and I a mere cypher, had something in them really offensive and extremely injurious, by raising a cabal against extending patents to twenty-one years; by which you extremely injured me, and yourself through me, for your only protection is in the protection of my rights. This you will discern when suits arise on the Delaware or Chesapeake.

You had no claims on me, either as relation or friend, yet I came forward and granted you great privileges which I hoped you would at least see the policy of acknowledging and maintaining. But the arduous desire to be thought an inventor has kept you at constant war with Livingston and Fulton, and particularly with me, my interests, and your own through me. This you have evinced in your writings, conversations, and acts. But, Sir, here ends writing on this subject, on my part. When justice fails, the law must make up the deficiency.

Unfortunately, the letters to Boyd, a congressman, cannot be found. Admitting his failure to keep a copy, the colonel insisted that Boyd, already opposed to any extension of patents, had not been affected by what was simply a protest against an extension for Fulton alone, as "sole inventor" of steamboats. Sole right had always been Fulton's claim, and that the latter still regarded his own patents as basic for steamboats, irrespective of relative dates upon them, is

plain enough from this last letter of Fulton's. Equally clear is it that he depended upon the New York courts to support him—as, in fact, they generally did. "When justice fails, the law must make up the deficiency" is, perhaps, an unusual view. In this case, it was a pretty accurate one. The colonel knew perfectly well that any legal battle on New York territory would be, for him, a battle lost before it was begun. Without writing further to Fulton, he proceeded to make the most of the existing opportunity to transport "horses, gigs, carriages, and cattle" at Hoboken.

One probable cause of Fulton's irritation just then was the colonel's having torn a leaf out of the book of Hudson. If a monopoly there were within the law, why should he not find a similar opportunity elsewhere? Casting about for a field of operations from which, by his agreement of 1809, he was not already excluded, he presently decided upon North Carolina. If a southern connection with, say, Norfolk could be established, the possibilities appeared great. Studying the geography and topography of the State, he went down the Cape Fear River to Smithville, and then visited Kingston, Beaufort, Swansborough, and Charleston. He planned to operate three boats, each 150 feet in length and 25 in beam; one on the Chesapeake Bay between Baltimore and Norfolk, one on the Albemarle and Pamlico sounds, and the third from Charleston, via Georgetown, to Kingston or some point on the Waggaman branch of the Pedee. This would involve a twenty-mile land-carriage from Norfolk to the Blackwater and an eighty-mile carriage from Kingston to Swansborough by way of Wilmington. With three boats making a run each way, every week, he expected to average two hundred passengers for the round trip. As to costs, it should be possible to carry each passenger from Philadelphia to Charleston, six hundred and ninety miles,

for $43, a material gain upon the current stage fare of $58.63.

His new project would require a stock company with $200,000 in hundred-dollar shares, for building and operating the boats, and yet investing 5 per cent. of the capital in public securities whose dividends could be applied to retiring the capital shares. For this he must have legislative authority, and he accordingly petitioned the North Carolina assembly for the exclusive right to run steamboats on the waters of the State. If granted such a right for twenty years, he would establish at least two steamboats; for each additional boat he asked an extension of five years, with the term not to exceed thirty years in all. Having sent in his petition, he was asked to amend it by promising, in case of his failing to start his own boats within two years, to "instruct and assist any persons willing and desirous to establish steamboats" in North Carolina; he, by virtue of his patents, so far as these might be used, to share in any profits made. This clause added, the bill was passed by the legislature on December 24, 1812.

In taking his agreement with Fulton and his own United States patents as a basis for his petition, he had reckoned not altogether wisely upon being undisturbed. Hardly had the engrossed copy of the bill been lodged in the state archives before he received an excited letter from Editor Lucas of "The Raleigh Minerva," to which he had become a subscriber. Lucas reported that a certain John Devereau De Lacy, acting as avowed agent of Fulton, had sent an open letter to the newspapers charging the colonel with obtaining his grant under false pretenses! Moreover, De Lacy, in urging the next legislature to eat the words of the last one and repeal the grant, declared that Fulton, intending suit, would file preliminary affidavits.

Reference has already been made to the Morgan library manuscript, that long paper written in Fulton's hand yet invariably naming him in the third person. Whether he intended this for use by De Lacy or by Cadwalader Colden is not clear, but the language and the date—"Feb'y 1813" —make it evident that the paper represented part of his attempt to block the colonel's North Carolina enterprise. After briefly summarizing the colonel's efforts and dismissing them all as negligible or as copies of "Mr. Fulton," the latter's claims to complete priority are set forth, with Mr. Fulton posing as Mr. Stevens's "benefactor" whom he would now "oppose and invade." In the same key, Oliver Evans is set aside as one who has "contrived to patent almost the whole machinery of mills and . . . written a book of dreams on steam-carriages." The "celebrated boats of Livingston and Fulton" are referred to, with some account of their plans for extending service to other waters. Success in producing "the first useful steamboat," says the manuscript, "required the fortunate circumstance of adequate genius and capital in the same person or persons, and they [Livingston and Fulton] persevered to success." And the conclusion is that "these, my countrymen, are enterprises worthy of a great nation, the result of the virtuous labours of [*two of our enterprising citizens* struck out] Livingston and Fulton."

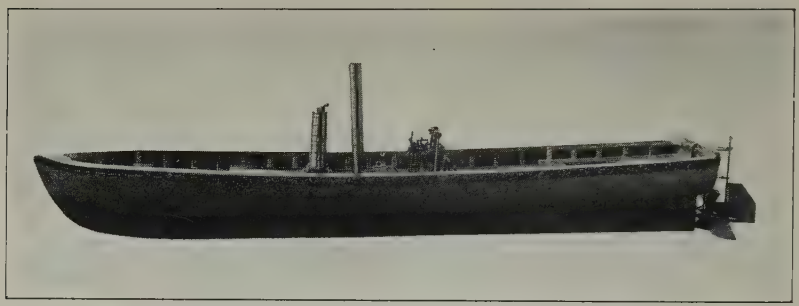
It was in this paper that Fulton made the two statements that throw the most light upon his conception of the Patent Law. "On 11 February, 1809," he writes, "Mr. Fulton received his first patent; on the 3rd of January, 1810, Mr. Stevens obtained a patent *not for a steamboat but for a boiler and a particular combination of machinery and the before mentioned floats.*" Mr. Fulton's second patent, *which is merely for some combinations in machinery,* is dated

"Feb'y 9, 1811." Apart from the obvious insinuation in Mr. Fulton's "receiving" his patent while Mr. Stevens "obtained" his, and quite apart from any question of the colonel's much earlier patents which are not mentioned, the words here set in italics perfectly illustrate Fulton's theory that ideas and formulas rather than actual machines were the objects of patent protection. This, with the chancellor's latitudinarianism in interpreting the Federal Constitution, really formed the basis of their whole quarrel with Colonel Stevens. At the moment of writing, three non-stop flights across the Atlantic have been made. By Fulton's standards, both Byrd and Chamberlin are distinctly infringers upon the rights of Lindbergh. How far Fulton pushed this point with the particular paper in question cannot be stated, because it bears no prints of the fingers through which it may have passed. One reference to it does appear in a book, but this was by a recent author who had not the contemporary documents at hand and merely quoted its brief reference to the experiments on the Seine. There is nothing to suggest for it any other purpose than the defeat of the colonel in Carolina. While Mr. Fulton was at work upon it, the colonel himself was writing to his son John Cox:

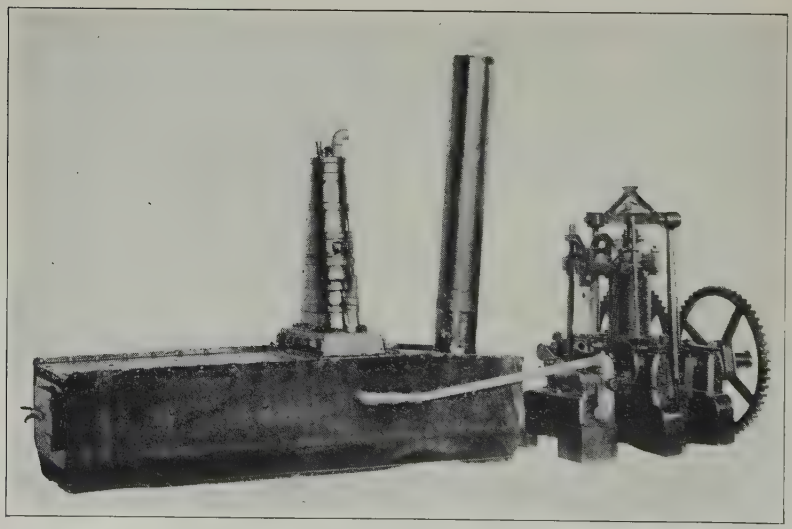
Hoboken, February 19, 1813

I have wished for some time . . . to have commenced a correspondence with the Chancellor on a subject which nearly concerns us both and which requires to be considered dispassionately in all its bearings. Apprehension that his state of health might not admit of his attention to business, I now sum up for you what I could wish might be communicated to him, or not, according to circumstances at your discretion.

In the month of October last, I received a very intemperate letter from Mr Fulton, a copy of which, with my answer, I . . . enclose. As Mr Fulton, in his reply, declines any further discussion and declares the law must decide between us,



A MODEL OF THE "LITTLE JULIANA"



THE ORIGINAL ENGINE AND BOILER

I have deemed it proper to state . . . through you, what have been my impressions on this . . . subject.

I have repeatedly, in conversation and in writing, declared unequivocally to the Chancellor and Mr Fulton, that I must and would have Steam Boats on the Hoboken Ferry; that the accommodation of the public, independently of my own individual interests, imperiously demanded this improvement; that it could not be expected I would ever be induced to make a voluntary sacrifice of such a valuable property; but that I was ready to make them any compensation for their state and patent rights they should require.

Accordingly, I . . . obtained a lease of the Ferry . . . for . . . fourteen years, on the express condition of establishing a Steam Boat. I have . . . had a . . . Boat running for these two seasons past . . . ; a sense of duty to the public, independently of other concerns, would compel me to support the establishment. However, rather than be involved in a suit with relations I so highly esteem, I now again repeat the offer . . . of paying such compensation . . . as may in reason be required.

In the meantime, in order to avoid all interference with Mr Fulton's patent, I shall . . . substitute a system of floats for which I have obtained a patent. . . . It will then remain to be considered whether the immense emoluments derivable from the State law are to be jeopardized by entering into a contest on grounds so inauspicious. . . . I hope that the Chancellor will not permit himself to be involved in a business so unpleasant and, let me add, so *very* unpopular, in the prosecution of which no benefit can result, but possibly much injury.

A timely letter. Exactly one week after it was written Robert R. Livingston was dead. The personal loss to the colonel was great, for, often as they had been in disagreement and diametrically opposed as were their views upon the Constitution, still, the chancellor and the colonel had contrived to keep on terms for the most part friendly. After all, they were brothers-in-law of long standing, cherishing

for each other an admiration which the colonel was never slow in expressing. By his nephew and namesake, as well as by the other Stevens children, the chancellor's death was deeply mourned. With him, unfortunately, died all real hope of compromising the fight over Hudson River steamboating and the new struggle over Carolina.

With Robert L. Livingston, representing the heirs to the chancellor's share in steamboats, the colonel did discuss a possible settlement of the Carolina question out of court. Extremely anxious to keep the *Juliana* running, in order to hold his fourteen-year lease, the colonel thought he now had something to exchange for Fulton's promise to leave the Hoboken ferry unmolested. "Since the public weal," he insisted, "demands a continuance of these boats, with what face can the Paulus Hook Company now come forward to demand of the heirs of Chancellor Livingston to stop them? The shortness of the ferry, and the great superiority of their boats in size, must forever secure them against effectual competition. And to wish to increase the emoluments, by effecting the ruin of the Hoboken Ferry would be conduct too disreputable to be expected." This, however, was the object soon made perfectly apparent.

For peace on the ferry, the colonel offered a share in his Carolina grant. After some discussion with Robert L. Livingston, he drafted a tentative agreement which he enclosed in a letter.

Hoboken, May 15, 1813

According to promise, I have drafted and made out two fair copies such . . . as I presume must be perfectly satisfactory. I have relinquished *all* the waters of the United States and substituted covenants, in the place of a simple recognition, which bind me much more effectually. To insist, therefore, on such recognition, for the attainment of no valuable purpose whatever, would be not merely indelicate, it would be un-

generous, cruel, and unjust. I hope and trust you will not suffer an accommodation of differences so essential to our mutual interests to be defeated on grounds of no real importance.

The agreement itself gave him the right to proceed with steam upon the Hudson, using such of Fulton's patents as he wished to use, provided he did not interfere with actual grants to the Paulus Hook Company. In return, he assigned one third of North Carolina to the chancellor's heirs and one third to Fulton, allowing the latter to undertake the actual management of the southern steamboats. Except for the waters covered in the agreement of 1809, he relinquished all steamboat highways and permitted the use of his patents by Fulton. In fact, the only thing withheld was the "recognition" of Fulton's patents as absolutely basic. Yet the younger Livingston, either personally or merely in behalf of his partners, would have none of the colonel's draft and said so in writing.

In resorting [he added] to the laws of our Country to maintain our rights, it will ever be a satisfaction to me and to my family that a proposition was made (thro' me) to you which, had it been accepted, would have prevented any further controversy between you and Mr Fulton.

The claim is doubtful. Within a week Fulton had drawn his own draft of agreement. He wanted "recognition" more than anything else, but he also stipulated that the colonel's ferry must not only have "the approval of Paulus Hook but also bind itself to transport only foot-passengers, goods, and marketing"—an impossible condition for the colonel, who immediately said as much to Fulton.

. . . I made a voluntary offer, thro' Mr Colden, of ceding one half of . . . my grant, provided I should be permitted

. . . to run steamboats on the . . . Ferry during the term of my lease. . . . This I consider as paying a very high price indeed for a privilege which is not . . . of any value to any . . . but myself.

In justice . . . to myself and family I cannot consent to vary . . . these terms. It rests . . . with you to determine whether to close with the offer I have been induced to make from a sincere desire to avoid litigation which, terminate as it may, cannot fail to be highly injurious to both parties.

Peace, except at his own price, was the last thing Fulton wanted; his next step was the swearing out of injunctions. In July the colonel wrote his son Robert that, in order to avoid actual seizure on the New York side, he was keeping his ferryboat at Hoboken. "The Paulus Hook Company having at last determined," he said, "that the *Juliana* shall not be permitted to run on any terms whatever, I shall set about dismantling her instantly and send her on to the Connecticut River." On August 3 he wrote again, to say that "James started from here with the *Juliana* on Thursday last, 9 o'clock, and arrived at Killingsworth, within 10 miles of the mouth of the Connecticut, at 10 o'clock on Friday morning. In proceeding from thence, he was chased by six barges filled with men—they got within four miles of him. He, however, arrived at Saybrook safe, at 3 o'clock in the afternoon, and proceeded on from thence up the river to Middletown."

Meanwhile, Fulton had done as De Lacy had predicted. His petition to the Carolina assembly begged that the Stevens grant be repealed as an injustice. He stated that the colonel had obtained this privilege "surreptitiously and by false suggestions," in violation of his agreement with Fulton and Livingston, and hinted that the members of the assem-

bly had been improperly approached. Maintaining that he himself had been cheated, he insisted that the colonel "never had invented or done one thing essential or indispensable in the construction of steamboats"—a claim denied by Fulton before the colonel had ever made it. These things were stated by Fulton as his "belief," and, since he swore to them before a notary, presumably he did believe them. This is not astonishing, in view of what he believed of his own patents.

These Fulton papers were duly forwarded by De Lacy, with a covering letter of his own, addressed to Governor Hawkins of Carolina. As agent, De Lacy declared that the grant tended "to deprive tortuously or hold in abeyance" the previously "vested rights" of Fulton. But thereafter De Lacy appears to have taken little part in the business. There is nothing in the papers of Colonel Stevens to indicate why De Lacy should have broken with Fulton, unless it was because he became convinced that the colonel had the right of the Carolina quarrel. Later evidence of this break is positive. It was De Lacy who inspired J. H. B. Latrobe to write, in 1815, his "Lost Chapter in Steam Boat History" which contains several highly interesting letters exchanged by Nicholas Roosevelt, the colonel, and the chancellor, all before 1800. De Lacy vigorously supported Latrobe's claim of paddle-wheel priority for Roosevelt and, in this connection, hotly attacked Fulton. On the other hand, it is of course quite possible that De Lacy was merely a legal hireling, paid to take up the cudgels for any man.

The colonel's own retort to Fulton was duly laid before the next session of the Carolina assembly by its speaker. In this, the terms of the agreement of 1809 were again quoted, the rest of the colonel's letter reading, in part:

Nov 9, 1813

. . . The chairman . . . of the Committee to whom my memorial was referred and who reported unanimously in favor . . . thereof, can . . . state to the House that I submitted . . . the subsisting agreement [with] Messrs Livingston and Fulton . . . my patents under the United States . . . the opinions of the Chief Justice and other Judges . . . as well as ample testimony . . . respecting the steam boats I had constructed on the Hudson and Delaware. . . .

A very extraordinary notice has appeared . . . under the signature of John Dev. De Lacy, attorney pro patentees, in which, among other calumnies and downright falsities, he has audaciously declared that "John Stevens has by an instrument in writing . . . formally and fully and unequivocally acknowledged that . . . Robert Fulton is the inventor of new and useful steamboats." Not one word of which is to be found in the contract . . . between us. Steam boats were first invented by Messrs Fitch and Rumsey, thirty or forty years ago, and I myself had a steam boat going on the Hudson some years before Mr Fulton came back to this country. He therefore can have no pretense to be the "inventor" of steam boats, and can only lay claim to such improvements as he may have made. As he has obtained a patent under the United States . . . any person infringing . . . will be liable to the . . . patent law. . . .

That I am competent to build steamboats superior to any now in use, I am able to procure the most ample testimonials, which will in a few days be transmitted. . . . I trust that no ex parte representations will have any influence . . . injurious to the rights of John Stevens.

The colonel appears to have made no specific reply to the memorial of Oliver Evans, in which the latter mildly remarked upon his own steamboat efforts and declared his reliance upon the governor of North Carolina to see that nothing to injure him was done by the legislature. In this fight Evans was not deeply interested; he merely protested against any possible discrimination.

For a month the various documents were debated by a Carolina committee including Gaston, Stone, Brown, Stanley, Cameron, and, as chairman, A. D. Murphy. It was Murphy who wrote to the colonel:

Raleigh, 20th Dec.

I enclose . . . the rough draft of the Report. . . . It might be satisfactory to learn what views the Legislature entertain. . . .

Messrs Stanley, Cameron, and myself . . . were members of the Committee to whom your memorial to the last session was referred. We fear the dispute . . . will prevent any of the Claimants from putting into operation a Steam Boat upon our Waters, and we feel anxious that you should not forfeit your rights by failing to have a . . . Boat . . . within the time prescribed. . . . The Report will fully fortify your Claims with the People. . . . If you care to come on to Fayetteville, you might form a company on the Cape Fear River. . . . I will subscribe for a few shares, altho' I live at a considerable distance, and aid your views as far as I can.

The official report, shortly issued, gave the colonel a definite victory. The legislature declared that its last session had received from him all the pertinent papers and had, in the interest of inland navigation, approved his petition. Regretting that a disagreement with Messrs. Evans and Fulton existed, no necessity for deciding this irrelevant question was recognized. But Fulton's charge of false pretenses, as a direct accusation against the State of North Carolina, could not be passed over in silence. It was "due to Mr. Stevens as well as to the last legislature to declare these charges unfounded and unbecoming." The resolution passed by the assembly on December 23 provided that "Robert Fulton and Oliver Evans have leave to withdraw their respective memorials."

There was an unfortunate pyrrhic flavor to the victory.

It had cost the colonel his steam ferry at Hoboken. Under the existing state of war he could not take up—any more than Fulton could—the business of building and operating southern boats. However, Robert, as the family draftsman, did make drawings for a new craft, "with what new machinery may be wanted, in order that we may get the castings." At Hoboken a model was built, of which the colonel wrote Robert that "John and Edwin undertook some experiments and, as was to be expected, contrived to break the spring at the first onset"; an expression of annoyance very rare with a man who usually had only praise for his sons' efforts. Had peace with Britain come sooner, the colonel would not have been obliged, just before his two-year term expired, to ask the legislature for an extension.

. . . The subscriber has watched anxiously for a favorable opportunity . . . but the state of public affairs has precluded attempts to introduce steamboats in North Carolina. . . . A vessel might have been built in a port of that state, but it would have been almost impracticable to construct the engine in any other place than New York or Philadelphia. . . .

Early last spring, he put the *Phoenix* into complete repair . . . flattering himself with a hope that the existing blockade might have been removed and the navigation of the sea restored. . . . Had the Commissioners at Ghent terminated . . . an amicable adjustment . . . the *Phoenix* would have landed a second time in the ocean . . . and reached the waters of the state. . . . He craves an extension . . . for some definite period . . . say one year after the termination of war.

The monumental work of preparing the state papers of North Carolina for adequate research has not yet been completed by her archivists. Beyond the apparent fact that steamboats were not running upon her waters until many years after 1814, the trace of the colonel's early effort remains still smothered in documents.

Of the "seven or eight steamboats" mentioned by the colonel as his Delaware rivals, the most interesting were the *Aetna*, built to demonstrate Evans's high-pressure engine, and the *Eagle*. Against the latter, the colonel considered bringing suit for infringement of his patents. Fulton, purporting to write "at the request of his partners," forbade any use of his patents as granted to the colonel for the Delaware, whereupon the colonel sought Horace Binney's opinion.

I think [said Binney] the Newcastle and Chesapeake people have no right to use any improvement on your machinery . . . made since your agreement of 1812. . . . You should call upon them . . . and inform them that you cannot permit them to use any of your own or Robert's improvements without compensation. . . .

You need not solicit Mr Fulton, or anybody else, to permit you the use of his name. . . . Since he has assigned you the . . . use . . . of the rights of the Delaware and other waters, which implies the right to use his name in suits, and since the Chancellor assigned you his rights . . . our courts will not regard his [Fulton's] interdiction. . . . I shall only want your several patents . . . to proceed.

Legally, then, the colonel was fortified. Personally, he cared very much more about "wiping the eye" of the *Eagle* on the river. Robert, sharing this ambition, tuned up the machinery of the *Philadelphia* and the *Phoenix* before reporting upon them to his father.

Philadelphia, Oct. 23, 1813

I arrived here night before last, in time for the grand illumination of the *Philadelphia*. She performs wonders.

We left Trenton at half past two . . . and arrived here at half past 8, yet lay at anchor an hour and a half or three-quarters . . . above Bordentown, owing to a piece of iron

. . . put on one of the plungers to increase its weight, falling between it and the box. . . . It wedged so hard as to bend the plug-tree, which . . . put the plugs out of place. After adjusting . . . we got the anchor up and were at Burlington in one hour. Two hours and twenty six minutes after, we were opposite Van Dusen's wharf. . . .

She went, as near as I could tell by throwing a piece of wood overboard, 132 feet—which was accurately measured—the first time in 15 seconds, the next in 14. The engine made 14 strokes and a half per minute. When we arrived, I tryed the New Castle boat; she went 132 feet in 19 seconds.

Steam was . . . up to three pounds only, though we might have had as much as we pleased, as the damper was only half-open. . . . There was such a quantity of steam that at times the man at the helm could not see. . . . The vacuum was 26 to 29 inches.

The [paddle] buckets have not been received; they are 6 feet by 2. The wheel is 16 feet 3 inches. . . . The floor cloths are down and we are finishing what little painting there was. . . . The pistons are packed with oakum and brick dust. Everything worked smooth and regular.

I intend the *Eagle*, *Phoenix*, and *Philadelphia* shall leave Philadelphia on Monday at the same time.

Robert's next letter, without doubt containing a full account of the race up the river, unfortunately cannot be found. It is highly probable that his gratified father circulated it among his friends and so mislaid it. However, the colonel's reply was full of significant suggestions.

Oct. 26th

We were all disposed to be very much out of humor with you for neglecting to write at a juncture of so much interest; but your very agreeable letters of the 23rd and 25th have amply compensated. . . .

The *Philadelphia* has indeed "performed wonders." There

could be no doubt about her exceeding in velocity anything that had yet swum, but I must confess she has far surpassed all my calculations, however sanguine I may be. That the *Eagle* whose rapid flight was to have outstript far and away that of the old *Phoenix*—that this vaunted *Eagle* should be beaten so disgracefully by the *Phoenix*—that she should be totally disabled for the season at least—is a victory as glorious on the Delaware as was that of Commodore Perry on Lake Erie! My dear boy, I now feel the fullest confidence that the victory you have so meritoriously obtained will prove complete—that the enemy will never again dare to unfurl his Flag on the waters of the Delaware!

But, to descend from this airy flight to plain language, we shall, I trust, be exempted from the necessity of resorting to legal measures, so pregnant with expense, uncertainty, and vexation.

Pray, what has become of the Wilmington boat, and how does Myers come on? Does the Newcastle boat run constantly, and has the boat on the Chesapeake got in motion yet? Do you expect your main beam will now be sufficiently strong? Have you figured a new cylinder above, between the two main ones, and does it answer? Does your working gear perform its office without *much* noise?

My operations here, in the horse-boat way, have been retarded. . . . The machinery, however, is in such a state of forwardness that I can count on an experiment very soon. Since sitting down to write, I hear the rain falling. . . . The storm is again renewed, and the Horse Boat riding by a slender rope. . . . Such a succession of storms I have never known. I hope the *Philadelphia* may not have set out, but have left it to the old *Phoenix* to buffet the storm.

The girls, three in number, purpose taking their departure on Monday next.

(Wednesday morning)

Give me as minute a detail of your rate of going, &c, as you can. It would not be amiss to have a puff inserted in the newspapers. I will try what I can do. . . . Give me also any particulars about the condition of the *Eagle*.

In a subsequent letter the colonel gave Robert further details of the horse-boat with which he proposed to replace the *Juliana:*

> . . . The middle boat 90 feet long and ten feet wide; the deck about 35 feet wide, the horse-walk 5 feet wide, and the floats of the wheel about six feet long. The wheel, ten feet diameter. I have selected the patterns of the bevel cog-wheels at McQueen's. . . .
>
> Large wheel, 10 ft., 132 cogs, working in small wheel, 37 in. (41 cogs); next, 65 in. diameter (84 cogs) working in wheel 24½ in. diameter, 31 cogs.
>
> 8.72 revolutions of the axis . . . for once around of the horses. . . . The water wheel about 18 revolutions in a minute which, considering their breadth, I think will be fast enough. I wish you would make a sketch . . . of the main axis, coupling-boxes, &c, which . . . may be of cast iron, from this rough sketch [enclosed]. . . .

A month later the colonel expected "to have the horse-boat planked up this week—the two side boats going on here, and ready by the time the middle boat is launched." The next season she began some years of successful operation on the Hoboken ferry, carrying "a considerable number of chairs at 31 cts.; saddle horses at 12½ cts.; and waggons at 25 or 50 depending upon whether they are light or heavy." Much encouraged, the colonel removed the temporary piles in the basin on the New York side and erected "convenient ferry-stairs, calculated to rise and fall with the tide, so as to preserve a due line with the fall of the boat." Hearing that this success had prompted the organization of a horse-boat company at New Brunswick, he bought shares in this when it was planned to follow the horse-boat *Experiment* with the steamboat *John Fitch.* As other companies would soon be springing into existence, he took out a patent for his own design.

Music, vocal and instrumental, at Hoboken,
and on board The Hoboken and Pioneer
brilliantly illuminated, will.
These Boats, weather permitting, will leave the Ferry Stairs
at the foot of Barclay Street in conjunction on
Evening next, at Eight O'clock precisely with a full Band
of Music. After landing Passengers at Hoboken, the two
Boats will return Together with the Music on board so as to
make another trip from New York at half past Eight. The
Music will then be landed at Hoboken, and remain there
till Eleven O'clock, when Both Boats will start Together
from Hoboken. In the intermediate time they will ply
singly as fast as possible. Those wishing to cross will
please to supply themselves with tickets at the Ferry House.

Hoboken 1824.

The Fa Queen will attend at Canal Street Ferry

COLONEL STEVENS' DRAFT OF AN ADVERTISEMENT OF HIS FERRY BOATS

. . . Three boats of equal length and breadth . . . giving, however, a greater relative length and breadth to the middle boat. . . . These placed parallel . . . and firmly connected at such distance apart as to leave . . . room on each side of the middle boat for the working of wheels with floats. . . . In the centre of the middle boat . . . an upright . . . shaft, the lower pivot or gudgeon of which works in a cast-iron pot standing on a support of cast iron sufficiently elevated to admit the axis of the water wheels to pass under. . . .

On this perpendicular axis . . . a large cog-wheel, into the teeth of which work the teeth of a smaller bevel on the axis of which is a larger, the teeth of which work alternately into [each of] two smaller wheels on the axis of the water wheels. . . .

The axis is in three pieces . . . with coupling-boxes; these . . . of such length as to admit the middle piece of said axis . . . to move horizontally athwart the boat about 7 inches each way. . . . By [this] means the cogs are thrown in and out of gear and the boat made, at pleasure, to move with either end foremost. . . .

To the upright axis . . . as many arms as necessary are attached, at such height as to admit of their passing freely over the vertices of the water wheels, and of such length as to admit men or beasts tackled thereto to pass around outside the water-wheels.

The method, said the colonel, could be applied either to the ordinary paddle-wheels or to the split paddles just designed by Robert. Also, in this same patent, he covered an alternative "method of propelling boats" in which he reverted to his favorite, the screw. This called for the familiar "arms of a windmill" at each end of a horizontal shaft run through the whole length of the boat, the arms being set at an angle which the colonel had "found from experience ought not to exceed 30 deg." Experimenting without the use of steam, the colonel drove this boat in either direction by two sets of spur-wheels, one forward, the other aft, the upper

wheels of each connected by a long rod which would "perform the office of a winch." In order "conveniently to steer said boat," he made use of "two rudders, attached to iron rods passing through the bottom near each end; these either equipollent or not as might be best." Although he looked upon this design as little more than another provision against being unable ever again to use steam on his ferry, it has now a greater significance. In 1881 Edwin A. Stevens, Jr., his grandson, perfected the machinery which made it possible to replace the old Hoboken side-wheelers with the modern boats, still double-ended but driven by propellers both forward and aft. Thus the patent of 1813 held one more seed of family development.

In the spring of 1814, fresh overhauling of the two Delaware boats by the Stevens boys resulted in a service which was faster than ever but still too slow to satisfy their father. His letter of June 9 was written to James, apparently the least easily convinced son.

> . . . It has occurred to me that it would be very practicable . . . and advantageous, to run the *Philadelphia* to and from Trenton every day. Before bouncing at once at a proposition you may be disposed to think extravagant . . . have the patience to give the following plan a serious and unprejudiced consideration.
>
> During the summer . . . the *Philadelphia* should leave every morning at 5 o'clock and leave Trenton every afternoon (Sundays excepted) at one o'clock. Let us see whether this can be accomplished with certainty and ease.
>
> Average passages up may be estimated at 5 hours, including stops; down again, 4½ hours. She would arrive, then, at Trenton at 10 . . . ; starting at one, arrive at Philadelphia again at half after five. This, surely, could not be called very hard work for either the boat or crew. But it may be said that wind and tide will occasion great variance. . . . I am convinced no combination can possibly protract her passage up

to 8 hours; I do not believe it will ever reach 7. Down, they will not vary much . . . as she will always run into a flood tide in about 3½ hours and reach Philadelphia before sundown. . . . We know to a certainty that steam can be kept up, by a small increase of fire, to 7 pds instead of 4 pds, and we also know we are able to give a much more considerable increase of fire, should it at any time be necessary.

Now, as to the land line. Should the boat arrive at Trenton early, the passengers might easily be taken on to Pawl's Hook by 8 o'clock in the evening. But, for the accommodation of every description of passenger, I would propose:

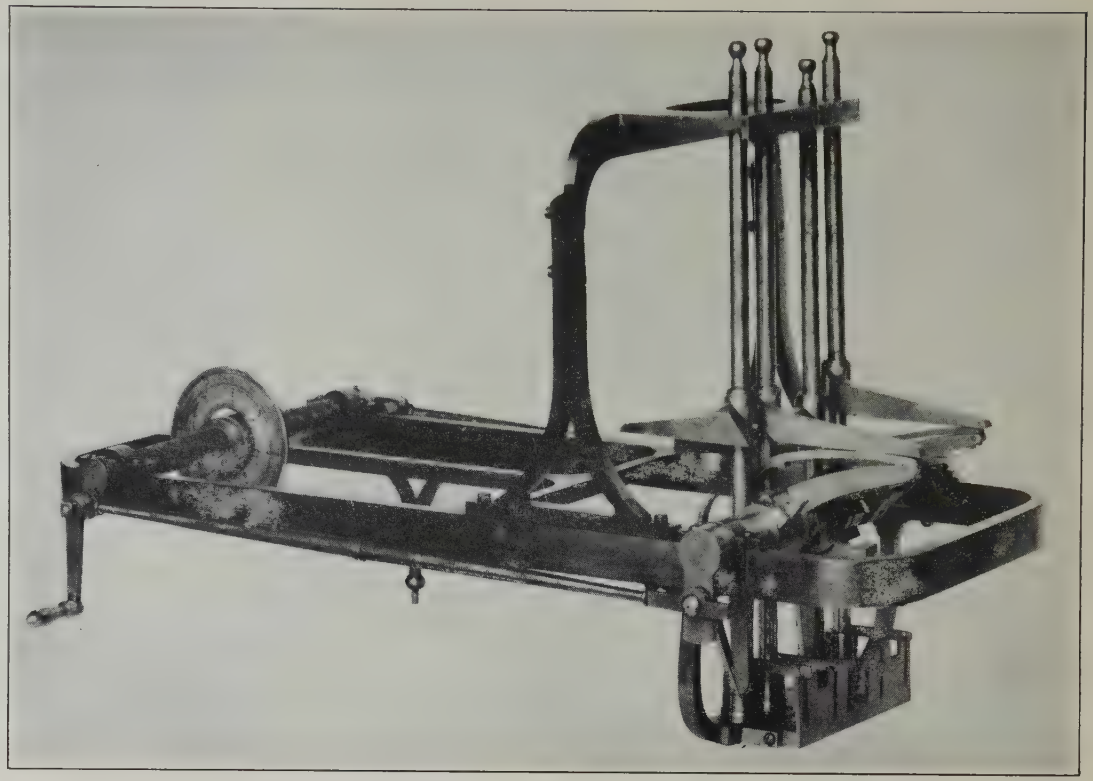
1. The Quick Line. Going thro' to Pawl's Hook every evening, and leaving New York every afternoon (except Saturday) at 5 or 6 o'clock. Will lodge at Elizabeth Town and, starting or 4 or 5 in the morning, will arrive in time for the boat. Fare, say 8 dollars; carrying only 7 passengers.

2. The Select Line. Going on to Bridgetown or Rahway and to Pawl's Hook early the next morning—and leaving New York every afternoon at 4. Will lodge at Bridgetown or Rahway and arrive next morning in time for the boat. Fare, say 8 dollars, carrying 7 passengers.

3. The Accommodation Line. Proceeding to Brunswick to lodge and to New York next day, before dinner. Leaving New York at 2 o'clock, will lodge at Brunswick, proceeding next morning to the boat. Fare, 5.75 as at present; carrying 12 or 14 passengers.

The water carriage is one third the whole distance. In this proportion, the fare of the steam boat ought to be 2.60 on the passengers in the two first lines, and 1.91 in the last. Put it at $2 and $1.50, making the land line $6 on the two first and 4.25 on the last. If they carry 12 or 14 passengers, on the last, this will be more profitable than the present fare, when we take into consideration that they will travel much slower than at present.

Over this plan of their father's the Stevens boys expressed some doubts. Of these, and of his retorts, the colonel has left a brief record.



STEAM CUT-OFF PERFECTED BY FRANCIS BOWES STEVENS

John's answer to my proposition is that it will create confusion in Accounts and there will be great risk in running the boats after dark. Both these objections appear to me frivolous.

To obviate the first completely a specific sum may be charged for the use of the boats, fuel, wages, &c. As to the next objection, it goes to the entire inhibition of running the boats at all after dark. This is a downright absurdity as, upon the present system on which the business is conducted, the boats run constantly every evening after dark; and that, too, in all weather—in cloudy, rainy, and stormy weather, as well as in fair. Lamps could be placed on each side of the ways, to prevent all possibility of accidents. But—they may run foul of vessels? By the illumination on board, this objection is wholly done away.

Speeding up his service appeared to the colonel to be the best answer to increasing competition. Capital was becoming confident of profit in a proved enterprise. In this same spring, a group of Philadelphians, headed by Samuel Meeker, planned a steam ferry at Gloucester on the Delaware. In Connecticut, Slidell, Dunham, and Richards came forward with money, while similar groups elsewhere began buying engines and boilers or designing their own for boats that sometimes ran and sometimes blew up at the first trial. Most important of all, there was Aaron Ogden, whose *Sea Horse*, finished in 1811, was no longer to be confined to the New York-Elizabeth run. The colonel had described her as "making two trips backwards and forwards each day; landing and taking off the passengers by running close to the Battery" and using small boats. When he learned of a new plan to connect the *Sea Horse*, by special stages, with the *Eagle*, it was plain that Ogden would bear watching.

On his first entry into steamboats, Ogden had looked like an active ally of the colonel's, to be helpful at the very moment when Livingston and Fulton were securing fresh

rights of seizure over "foreign" vessels in New York waters. With Daniel Dod as principal partner, and a considerable fortune available, Ogden appeared prepared to fight the monopolists. His influence pushed through the Jersey legislature an act granting him exclusive privileges in Jersey waters—a blow which the monopolists, through their *Raritan*, were not long in feeling, and which caused John R. Livingston, after refusing a *Phoenix-Raritan* combination for better Jersey service, to come back to the colonel with an appeal for help. "You will oblige me," he wrote, "by informing me whether the original grant to my Brother did not include yourself and Cornelius [Nicholas] Roosevelt by name, both at that time living in New York and considered as Jerseymen. Also, whether the crank now used in Colonel Ogden's boat was not used in your *Phoenix* and whether his method, in your opinion, is any improvement." Like Fulton, John Livingston wanted Ogden's scalp, even though he should have to hang it before a Stevens tepee.

The colonel did put in a petition against Ogden's Jersey privilege. In it he maintained that, if any Jerseyman had a monopoly, it should be himself as her first citizen to engage in steamboating. However, he declared himself opposed to a monopoly for anybody, describing this as "uncongenial, and incompatible with the nature and genius of our free government." For the lion's share of the business, said he, he greatly preferred to depend "solely upon the superiority of his boats" and upon the demonstrated fact that his *Philadelphia* was, by at least two miles an hour, the fastest craft afloat. His argument was long, but its only effect appears to have been to play into the hands of Fulton. When the New Jersey assembly reversed itself and repealed Ogden's privilege, the colonel's position was actually no better than before.

Ogden, furious with New Jersey, was not without power to hit back in New York. In the effort to bring about a repeal of the broad acts in favor of Livingston and Fulton he pleaded his case in person before the legislature at Albany. So eloquent was he in this—the first public attack upon the monopoly on constitutional grounds—that he actually won in the lower house and lost by only a single vote in the upper one. So close a call, in a Livingston stronghold, was too much for the monopolists. They promptly compromised with Ogden, letting him buy, for use in New Jersey, a ten-year right to all their patents and privileges. The obvious result was that Ogden was arrayed against the colonel, who had to wait another ten years before John Marshall turned the Hudson tide.

Taken as a whole, no years of the colonel's life were more active than those of 1807 to 1814. The Revolutionary years had been as many in number but not so full. Scientific and commercial correspondence was so heavy that he scarcely found time for personal affairs. When Rachel's mother died, in February, 1814, he could make only a hurried visit to her Philadelphia home, and had to leave the care of her estate to his fellow-executors. Similarly, he could give scanty attention to such appeals as that of Robert Forman of Pittstown.

> The church in which your father was interred is much out of repair. The fence or yard is entirely done away with; cattle, sheep, hogs, &c rest on the very earth that covers your father's remains in Cold Weather. Should you be desirous of having a marble slab placed when the floor is laid down, it will be placed level with it; as also we intend to raise that of your Uncle Lewis [there is an inscription on his].

Since Forman must have a prompt answer in order "to finish the church and yard in the spring," the colonel's only

reply appears to have been a subscription; to be added to the others which, as already noted, have sufficed to keep little St. Thomas's alive to-day. Most of such intimately personal affairs were smothered by the pressure of outside interests.

Yet, in addition to what has already been described or outlined, the same seven years included another great activity of the colonel's. We have no hint of his ordinary rising hour, beyond that it was "early"; we have nothing exact upon the hour when he was in the habit of snuffing out his bed-candle. Unless the stretch between these moments was very long, he could never have found time to launch a project that, among all his others, was considered the most utterly visionary although it contained the greatest of his prophecies upon the nation's future. To consider it, we must step ashore from the Delaware steamboats and look back to 1810.

CHAPTER SIXTEEN

Rails to facilitate wagon haul run back three centuries from our day and vanish in a much older custom of filling holes in dirt roads with planks or rough logs. Beaumont's crude wooden affairs of 1630 represent the best-known early effort at definite tracks. They had the symbolic purpose of carrying coals at Newcastle-on-Tyne, but the carts running upon them were still horse-drawn. He was long dead and forgotten, and John Stevens was a boy of fourteen, when Cugnot, in 1763, designed the first steam-carriage to run upon the ordinary highway. Iron rails date from 1767, but were not combined with the steam-carriage until much later.

The story of English efforts to make transportation on land better and faster than on water is a familiar one, punctuated with the names of men who had their several claims to priority in one pertinent invention or another. Trevithick brought out his improved locomotive in 1804. Brinton's quaint tractor had legs at the rear—the grasshopper leading the modern caterpillar by a hundred years—and there were many other strange devices. Every such attempt was ridiculed, yet each helped to pave the way down which the Stephensons finally drove their famous "Rocket," nosing out Ericsson's "Novelty" and convincing the world that steam railways were an accomplished fact. Their triumph came in 1829, almost two centuries after Beaumont; the railroad giant we know has not yet turned the hundred-year mark.

Twenty years before the "Rocket," American interest in

steam on land was almost non-existent. The clever, ambitious but unlucky Oliver Evans had devoted much time to his amphibious "Eruktor" as a prophecy that steam would finally come ashore, only to discover that nobody believed him. Most men looked upon locomotives as mere figments of diseased imaginations; as will-o'-the-wisps with bodies no more tangible than steam itself. After one casual glance, they turned away, very probably to join in the canal enthusiasm which Gouverneur Morris, De Witt Clinton, Fulton, and others labored so hard to arouse. Their plan was to dig the Erie Canal as the first link in a nation-wide chain of water communication, transporting passengers and freight at an unbelievably low cost. At first the idea met with considerable opposition; little by little it was widely adopted. Subscription books flew open. Legislatures prepared to defend themselves against a barrage of petitions for charters, rights of way, and appropriations. In New York State, shovels were sharpened and picks were fitted with new handles. "Dig! Dig! Canals will solve the transportation problem forever!" That was the slogan.

Colonel Stevens heard the cries plainly enough but did not share the enthusiasm of the optimists. As to that, it never was his way to make one of a flock of sheep—unless he ran at the head. The man for his money was *Sir Anthony Gloucester*, with his motto of "Keep your light so shining, a little ahead of the rest!" The colonel's hat was not flung into the air, to fall among the rest in the canal. While he agreed that natural waterways were of the greatest importance for increasing the value of steamboats, he was far from admitting that canals would give the country that internal transportation upon which its future prosperity depended.

"Concede," he wrote at this time, "that there are now no

Steam Rail-Ways anywhere in the world. This is not to say that they will not come—and that soon. As civilization progresses, water-carriage will prove too slow and cumbersome to satisfy the demands of humanity. And this, too, though it remain relatively cheap. What has been accomplished, in comparatively few years, with Steam Boats, points, as I conceive, directly at the Steam Carriage. Merely by developing a method of correctly applying the same principles on land, a great saving in time and cost will be effected."

Time and cost had always been important factors, but never more so than just then. McMaster's "History of the People of the United States" is full of pertinent figures of the period. According to this authority, moving a barrel of flour down the Susquehanna from the Genessee Valley to Columbia and thence to Philadelphia, involved a carrying charge of one dollar and a quarter, plus the excellent chance of spoiling the flour on its slow journey in barges or behind plodding horses. Shippers from the Chesapeake to Philadelphia sent their goods across from Frenchtown to Newcastle under a rate schedule of six cents a bushel for wheat, twenty-five cents a barrel for flour, two dollars a hogshead for tobacco, and about nine dollars per ton of general freight. Overland, from Pittsburgh to Philadelphia, the cost per ton reached the impossible figure of $125. Five dollars a barrel of flour, salt a dollar a bushel over a hundred miles, and the time running on into weeks! Goods that could survive the cut-throat rates perished between shipment and delivery; they disappeared from interstate commerce.

It was evident to the colonel that a great factor in this impossible situation was the deplorable state of the highways, to say nothing of the bogs and boulders making up what passed as ordinary roads. Theoretically, tolls were sup-

posed to support the roads. Across New Jersey the charges were a cent a mile for each horse; in Pennsylvania, depending upon the width of "tyres" and the number of horses, rates varied at about double New Jersey's. Through Virginia a loaded wagon cost twelve cents for every twenty-five miles. Practically, the charges did not keep the roads in condition; yet, paying what it must pay, and progressing at a feeble crawl, American transportation had become a problem so serious as to be almost ridiculous.

In proposing to improve matters almost at a stroke, the colonel supported the prophecies of Evans. Having a far wider acquaintance and a much more assured position than Evans possessed, the colonel resolved to make the utmost use of both. He began writing to all his friends, pointing out that most roads were impassable during the winter months and suggesting that this condition could be overcome by laying rails above the ordinary line of frost and snow. In England, he reminded them, horse-drawn carts had been successfully run upon rails. After all, he asked, wherein lay any great difference between horse-drawn and steam-drawn wagons or carriages? Apply the steamboat principle, and the thing would be done.

He did not stop at personal friends. Only let a man be recognized in national public life, or even no more than a leader in his own small community, sooner or later that man had a letter from John Stevens, presenting his case from one viewpoint or another, asking for suggestion, coöperation, or a letter of introduction to some other man who might be interested. Rufus King, Duane, Morris, Clinton, Van Rensselaer, Dickerson—these and a host of much lesser men all heard from the colonel upon the subject.

As a preliminary step in the right direction, this was a disappointingly short one. The colonel had answers to his

letters—dozens of answers. Both friends and acquaintances praised his scientific mind and called themselves flattered by his having written. "Your plan," said most of them in substance, "does credit to your highly ingenious mind. But I do not conceive . . ." As always, they remained his most humble and obedient—if quite unimaginative—servants, signed their names with flourishes, and posted their letters on their way to subscribe to more canals.

There was excuse for general lack of conception and vision. The idea was new and hence impracticable of realization. News of English efforts was long in coming and very often held to be unreliable. Also, to many the accidents which had occurred in steamboats were discouraging if not actually terrifying. To others canals looked like good vote-breeders, while still others were unwilling to risk money in any sort of experiment. On top of these reasons the colonel had the bad luck to advance his plan at a moment when men's minds were full of the dreadful imminence of war with England, although this was actually more than a year away.

Questions, whispered in one place and shouted in another, dealt with what Britain might do as "overt act"; with the possible means of defending New York city against the British fleet; and with the chances at sea of such ships as Jefferson had allowed us to keep. In this confusion there were many who knew that the United States was utterly unprepared for war, but very few who recognized the connection between this fact and the colonel's suggestion. The idea that the service of supply and the line of communication would come to depend heavily upon railroads was as far from men's minds as the conception that the old *Constitution* could strip to battle-canvas and, virtually single-handed, win "Mr Madison's War." History, with so much to say of "*Old Ironsides*," has left room for speculating

upon what might have happened on land if Colonel Stevens's plans had been tried during the years preceding the war. Washington might not have been burned. Old Hickory, traveling more easily from front to front, might have bolstered the defense offered by incompetent leaders against the British troops. It is now too late to discover.

The general apathy, and his increasing steamboat activities of 1811, pushed railroading into the back of the colonel's own mind. He still talked of it to any one who would listen; as opportunity offered, he wrote of it sporadically. But his next real campaign was not launched until early in 1812, when he sent Governor De Witt Clinton a letter, "put into the hands of Mr White, who leaves by the Mail stage for Albany."

New York,
February 24th, 1812

I enclose a memoir addressed to the Commissioners for exploring an inland navigation, &c.

The more I reflect on the plan I have proposed, the more thorough is my conviction, not merely of its practicability, but that it must eventually supersede every other means of conveyance, where the nature of the country will admit of its introduction. Under such impressions, I consider myself impelled by duty to urge its adoption by the Commissioners.

An experiment, sufficiently extensive to ascertain unquestionably its real merits or demerits, could be tried at the expense of two or three thousand dollars.

This was the opening shot of much gunning to bring down Clinton's influence in the State. The colonel did not greatly like the man or his Presidential hopes, but he knew what Clinton, were some of his attention once diverted from canals, could do for railroads. Were Clinton convinced, that mere fact would convince Clinton's party; before long others

would join the procession, and the "two or three thousand dollars" would be forthcoming many times over.

The memoir began by "concurring heartily" with the canal commissioners in feeling that the value of canals would justify a great expense in digging them. Quoting their own words, the colonel agreed with the gentlemen that, "were it (by giving a loose to fancy) to cost fifty millions," even that vast sum might not be excessive. But in digging, as in using, canals there were difficulties such as frost and ice to be considered; above all, there was the vital element of time. To him the objects of primary importance were, first, completing communication with the West as soon as possible, and next, completing it by means so efficient "that travel should be at no time interrupted."

Between Lake Erie and Albany, said he, the grade was slight. He proposed that "a rail-way of timber be formed, of such angle of elevation as would admit of wheel-carriages to remain stationary when no power is exerted to impel them forward." Let this railway be supported upon pillars, raising it from three to six feet above the ground. Let the carriage-wheels be "of cast-iron, the rims flat, with projecting flanges to fit the surface of the rails. The moving power to be a steam-engine, similar in construction to that on board the *Juliana*, a ferry-boat plying between New York and Hoboken."

In a few words, that sums up the colonel's proposal, the earliest to deal with a definite plan for an American steam railroad. Discussing it more fully, he dealt with the "many and important advantages which would result from carrying it into effect." To begin with, its cost would be not greater than that of "a good turnpike road, well gravelled"; there being little grading necessary and the work being entirely within the capabilities of unskilled labor, if super-

vised. With the road raised above the line of ordinary snow, there would be practically no interruption of traffic from this cause. Once completed, the cost of transportation over it would be less than upon a canal of the best construction.

In support of this last contention the colonel again quoted the commissioners. "By the aid of a railway, one horse would transport eight tons, supposing the angle of ascent not to exceed one degree." Also, he cited from "Nicolson's Journal" an account of the transportation, by one horse on a railway of several miles, the enormous weight of fifty tons. Now, said he, "a small steam engine, of ten inches diameter, worked with steam the elastic power of which was fifty pounds to the circular inch, would possess a power equal to five thousand pounds on the whole area of the piston, moving with a velocity of three feet in a second. This would exceed the power of twenty horses who could, by the statement of the Commissioners, transport one hundred and sixty tons." Allowing a liberal percentage for the appearance of exaggeration, he put the estimated transportable tonnage at one hundred, on the level. As the difference in elevation between Lake Erie and Albany, a distance of two hundred and eighty miles, amounted only to some five hundred feet, he considered it perfectly proper to speak of the line as nearly level, warranting an estimated speed of four miles an hour. How, then, was the cost of transportation to be calculated?

Such a steam-engine as he proposed using would consume, he said, about one cord of wood a day. "To silence all cavil," however, put this estimate at three cords. Similarly, although wood in the given locality cost one dollar a cord, he proposed taking this cost as double. To "attend the fire and perform other services," he allowed four men, at one dollar a day each; that is, for fuel and service, a total of ten dollars a day. If the back-load averaged only one third of a

full freight, the net cost of transporting one hundred tons over the full distance of two hundred and eighty miles would be five days at ten dollars each; fifty dollars total, or fifty cents per ton. Since this calculation took no account of "interest on the capital expended, wear and tear, repair of machinery, carriages, railways, &c, and no doubt many other incidental charges," it would be better to raise this cost to one dollar per ton. Even so, had not the commissioners estimated the cost of transportation through the contemplated canal at *three dollars per ton?* Hence, taking the cost of laying the railway at one fourth that of digging the canal, was it not "easy to see what an immense revenue the State might derive from toll, and still permit transportation at much less than could be done on a canal?"

Here, went on the colonel, he expected "to be encountered at the very threshold—to be stigmatized as a visionary projector." With confidence undiminished by the cold reception already given the idea, he was prepared to face criticism. It would be held by those who had studied England's efforts that her failure to combine rails and steam-carriages proved them incompatible. In answer to this the colonel cited what had been done with steamboats, and could not resist a dig at Latrobe's already quoted objections, which had been proved unfounded as far as water transportation was concerned. "If," he wrote, "the steam-engine has successfully been applied to boats, we surely need not despair of successfully applying it to carriages. We are too apt to look up with reverential awe to what has usually been called the mother-country, for every improvement in the arts"—why not bring *this one* about in America?

Included in the memoir was a comparison of the probable wear and tear on rails with that on plank bridges, as well as a discussion of the shape of carriage-wheels and the

ease with which the rails, if necessary, could be faced with iron. In short, every phase of the problem was touched upon, and in the final paragraph the colonel expressed his faith in the speeds of the future.

As the power of the engine is expended principally in overcoming friction, which is increased in but a small degree by an increase of velocity and may be removed almost entirely by the use of friction wheels, a carriage may be made, by a small increase of power, to acquire a velocity far greater than could be given by the fleetest horses; and as, too, the railroads must be incomparably better than the best turnpike could possibly be made, I am by no means prepared to say what limits may be set to the rapidity with which a carriage may be driven on these ways.

Laugh at him? Call him a visionary projector? The general sentiment was far less flattering than that. True, said scientists and engineers, a steam-engine actually had been put into a boat that was making regular trips. But on land? Why, the carriages would run off the rails and fall apart; the engines would blow up and kill their drivers. Even were there no human fatalities, the peaceful live stock in the fields would be terrified to death by such snorting monsters. "Much learning," in John Stevens's case, "hath made him mad!"

Naturally, Chancellor Livingston was among the first to whom the colonel appealed. Enlisted upon the right side of the fight, Livingston, like Clinton, would be a most powerful ally. Unfortunately, he remained in the great army of doubters, as his letter of March 11, 1812, shows:

. . . I have read of your very ingenious proposition . . . as to railway communication. I fear, however, on mature reflection, that they will be liable to serious objection and ulti-

mately prove more expensive than canals. They must be double, so as to prevent the danger of two such heavy bodies meeting. The wall on which they are placed must be at least four feet below the surface, to avoid frost, and three feet above to avoid snow; must be clasped with iron, and even then would hardly sustain so heavy a weight as you propose moving at the rate of four miles an hour on wheels. As to wood, it would not last a week. They must be covered with iron and that, too, very thick and strong.

The means of stopping these heavy carriages without a great shock, and of preventing them from running into each other —for there would be many running on the road at once— would be very difficult. In case of accidental stops or necessary stops to take on wood or water, &c, many accidents would happen. The carriage of condensing water would be troublesome. Upon the whole, I fear the expense would be much greater than that of canals, without being so convenient.

The chancellor's objections are typical of his day, and it is not at all astonishing that he could not see through the minor details to the major vision beyond. The obstacles he raised were to be overcome one by one; when he named them they loomed high. Something to be noted in connection with this particular letter is that he apparently sent a copy of it to Fulton, his steamboat partner. This seems the only possible explanation of its use, by at least one of Fulton's biographers, to demonstrate his (Fulton's) advanced ideas of railroading, as opposed to Livingston's excessive caution. Doubtless Fulton was to some extent interested in railroads, but the original of this letter is among Colonel Stevens's papers. Moreover, a copy of it forms part of the printed pamphlet into which he eventually combined the various documents on the subject; a use of it which he would not have made had it not been addressed to him. Finally, there is his own reply to Livingston.

New York, March 16, 1812

Yours of the 11th inst. I have just now received and, as you probably will not remain in Albany . . . I have directed [this] to Mr G. Morris, that the Commissioners may be duly apprized of the answers I shall give to your objections. . . .

You say "the expense would be much greater than . . . canals." . . . I have stated the expense of a railway at one-fourth. . . . I am now convinced the difference will be much greater, if wood only is used. The Commissioners have estimated the expense of excavating . . . at $1,500,000 through a favorable soil, without the opposition of rocks or other impediments. . . . These, however, must be expected and [will] perhaps double that sum. . . . The cost of the canal merely, is estimated . . . at $3,000,000. "If the locks," say the Commissioners, "be put at $1,500,000, it is the lowest rate that can prudently be supposed." It would indeed . . . be safer to put them at $2,000,000.

There remains the cost of the railway. . . . Calculating timber at New York prices of twelve and a half cents per cubic foot, four rails of six inches, by twelve inches deep, equals $1320 a mile. The posts, eight feet long, at twenty-five cents apiece; twelve feet apart, four rows, would be $440 per mile. Digging holes, setting posts, braces, and carpenter work, $740. Total 2,500 a mile or $750,000 for the whole three hundred miles. $500,000 estimated for embankments, mounds, &c, makes an aggregate of $1,250,000 for the whole railway. . . . Should they require to be renewed every ten years . . . a capital of $1,500,000 would be sufficient. . . .

Were we to admit the absolute necessity of shoeing . . . with iron, the expense . . . would fall far short of a canal. . . . I should prefer plate iron about an eighth inch thick. . . . Shoeing four rails would cost less than $4,000 per mile. . . . Should cast iron be preferred, plates an inch thick would cost, for the whole distance, $3,000,000. . . .

One manifest advantage. . . . We should be able to count the cost of the undertaking . . . before the business was commenced, whereas the cost of a canal is conjectural. . . . Were I not thoroughly convinced of the many superior advantages of the railway . . . the mere saving of expense would induce

DOCUMENTS

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NEW-YORK
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No. 160 Pearl-Street.
1812

THE FIRST AMERICAN PUBLICATION ON RAILROADS

me to press their adoption. But were railways to cost fifty millions and a canal . . . five, yet still the railway would ultimately prove the cheapest.

The period is not far distant when the annual amount of saving (by substituting railways) would be equal to legal interest on fifty million dollars, even should the calculation be founded on the supposition that the increase of population should be in future no greater than . . . what it has been for the last ten years. The increase will be . . . much greater, should these railways be completed. . . .

I am surprised that you consider canals more convenient. . . . On the contrary, railways have in many respects a preference. . . . There are no locks to pass, with interruptions and delays. . . . Every one, whether travelling for business or pleasure, can calculate with certainty . . . when he will arrive. . . . Wind and tide, rough and smooth water, light or darkness, would have no influence over steam-carriages. . . .

It is not certainty alone, but the celerity and despatch of this mode . . . which gives it so decided a preference. . . . The farmer . . . will save three days out of four. . . . The traveller will in one day perform more than a week's journey on a canal.

There are easy and effective ways of guarding against accident. . . . Deposits of wood and water must be formed every ten or twelve miles. . . . Carriages must make no regular halt except at these places, which must be on level ground. All carriages which stop at one time and place [must] be firmly connected together. . . . The conductor of each suit of carriages is precisely acquainted with the position of each stopping-place and . . . takes care to bring-to in time, so as not to run against other carriages. . . . For the accommodation of passengers . . . it will be easy to contrive . . . at stopping-places, a mode of turning out on adjoining ways, to admit of their passing carriages for the transport of heavy goods. . . .

I am surprised you should apprehend difficulty in stopping carriages without heavy shock. On stopping the engine, the friction of the wheels, turning on their axis, will gradually retard the motion of the whole suit.

You say the carriage of condensing water would be very troublesome. I am persuaded you would never have advanced this objection, had you adverted to my stating expressly . . . that the engine was to be wrought by the elasticity of steam merely.

Your objections have served to establish more firmly . . . the very favorable sentiments I entertain respecting the utility of railways.

Enclosed with this letter was one to Chairman Morris:

. . . The only question is, whether steam engines can, without much difficulty, be applied to . . . propelling carriages. To . . . opinion on this matter, I certainly have some pretensions. . . . I am firmly convinced that engines can be applied . . . with much more facility than they are now used for . . . boats. . . . But to place the matter beyond all doubt, let it be subjected to the infallible test of experiment. . . . I pledge myself that the cost of these . . . shall not exceed $3,000. . . .

I am aware how unnecessary it would be to . . . point out to you the magnitude and importance of the consequences which must . . . result from these railways . . . coming into general use. The communication between the extremes of this extensive empire would be rendered beyond all conception rapid and, at all seasons and in all weathers, invariably certain. What influence these circumstances would have on the moral, political, and intellectual attainments of the citizens of these United States, cannot now be duly appreciated; unquestionably, their permanent prosperity and happiness, as well as temporary ease and comfort, would be greatly promoted. . . .

As steam *boats* have been first brought into practical use on the waters of the Hudson, so I hope and trust that it will not be long before the abundant products of our interior will be conveyed to the banks of this noble river by means of *steam-carriages*.

From Clinton the colonel had received a promise that his "interesting communication" should be laid before the

commission. A reply from that august body came a few days after this last letter to Morris. Hence it appears, as a matter of record, that the time spent in deliberating upon the most important domestic question ever raised in America was *considerably less than three weeks.* Is it any wonder that the result of that deliberation was a rude shock to the colonel?

The commission, having given the proposals that consideration due to a "gentleman whose scientific researches and knowledge of mechanical powers entitle his opinion to great respect," found itself unable to concur with him:

> Mr Stevens proposes a railway on which a steam engine is to propel, by a force equal to the competent number of horses, one hundred tons at the rate of four miles an hour. . . . It is doubted whether an engine in a wagon can work it forward with as much advantage as a horse on a road. . . .
>
> It is proposed that one hundred tons be put in motion . . . at the rate of nearly two yards a second. . . . [Considering friction] it does not seem possible that a way could be made of sufficient strength. . . . Moreover, it is self-evident that the same way will not serve for carriages going and returning; the expense which would . . . for a single way, exceed that of a canal, must be doubled, and would therefore render the construction unadvisable, were it sanctioned by experience.

Plainly, it was not the colonel who had the single-track mind. The commissioners' objection to the use of wood as not strong enough does them credit, but is thrown entirely into the shadow of their complete failure to see the greatness of the ultimate object or even consent to an experiment which might have disclosed it. In substance, John Stevens had told them that the future of America depended upon railroads, exactly the idea regarded as startlingly new when Commodore Vanderbilt brought it forward again fifty years

later. A short wooden railway in 1812 might easily have demonstrated the necessity for iron and stimulated inventors to design the modern rail, long before Robert Stevens found time to do it. The years thus lost meant the defeat of the colonel's hope that America might lead the world in making railroads practicable.

But he did not throw up the sponge. At great length he wrote a rejoinder to the commissioners in which he was somewhat caustic. "The objections," said he, "appear to me so void of real foundation that I am constrained to repeat—they merely served to establish . . . the sentiments I entertain . . . respecting railways." Continuing, he wrote:

> . . . Executed in the most durable manner, this great undertaking could be completed—with stone pillars and iron ways—for a sum certainly not exceeding four millions of dollars. . . .
>
> Notwithstanding the many inconveniences "the great utility of canals is sanctioned by experience," whereas the . . . utility of railways remains yet to be ascertained by actual experiment. But, when millions are to be expended, shall a few thousand be grudged . . . on an object promising so fairly? . . . Sooner or later, the improvement now proposed will be brought into general use and, if I mistake not, long before the proposed canal will be completed.

When his arguments failed to move the commissioners even to the point of a simple experiment, the colonel resolved to go over their heads to the people themselves. He made a bundle of all the documents, clapped on his hat, and marched down to interview Messrs. T. & J. Swords, in Pearl Street. If these gentlemen were not railway enthusiasts, they were practical printers. While they set up the colonel's papers in type, he worked at an "Introduction" which he hoped might strike the popular note and win approval for his "Docu-

ments Tending to Prove the Superior Advantages of Railways and Steam Carriages over Canal Navigation." To any one who would read the pamphlet he presented a copy, but it appears that there are now only half a dozen in existence. In 1852 President Charles King of Columbia, in his address on "The Progress of the City of New York," told of making "an exhaustive search, finally to discover a copy in the New York Society Library." From this, Robert and Edwin ordered a reprint struck off, appropriately enough by Stanford & Swords, successors to the original printers. They might have saved themselves considerable search by glancing through their father's papers, where there was an original, still in excellent condition to-day. When it recently came to light, an official of the Pennsylvania system, reading it for the first time, called it "the birth-certificate of all railroads in the United States." So it was. Unfortunately, the original birth was not only premature but generally regarded as abortive. The attitude of legislators was discouraging. As Senator R. F. Stockton years afterward put it, "they turned from him with pity and incredulity." The man in the street was even less considerate. His comment was "Heard John Stevens' latest? He's making a damned fool of himself over steam-waggons!" Much he cared for that.

In the introduction to his pamphlet he covered almost every point not specifically dealt with in the earlier letters.

> . . . So many and so important are the advantages which these States would derive from the general adoption of the proposed railways that they ought, in my humble opinion, to become an object of primary attention to the national government. . . .
>
> On the success of [an experiment] . . . a general system of internal communication and conveyance [should be] adopted, and the necessary surveys made . . . to embrace

and unite every section. . . . *It might then, indeed, be truly said that these States would constitute one family intimately connected and held together in indissoluble bonds of union.* . . .

The revenue which this mode of transportation . . . would be capable of producing, would far exceed the aggregate amount of duties on foreign importation. . . . It is an indisputable fact that the aggregate . . . of annual interstate commerce is vastly greater than that of external commerce. . . .

The farmer would save four-fifths of his present expense in transporting his produce to market. . . . Innumerable ramifications would . . . be extended in every direction. . . . The sources of private and public wealth would increase with a rapidity beyond all parallel. . . .

There remains another important point . . . celerity of communication—a consideration of the highest moment. If the Proas of the Pacific can be driven at twenty miles an hour by the wind, I can see nothing to hinder a steam-carriage from moving with a velocity of one hundred miles an hour. . . . In practice, it may not be advisable to exceed twenty or thirty miles . . . but I should not be surprised at seeing carriages propelled at forty or fifty. . . .

Military . . . advantages . . . would also be incalculable. Armies could be conveyed in twenty-four hours a greater distance than it would take them weeks or perhaps months to march. . . . This . . . would afford us not only means of guarding against an enemy, but of expeditiously quelling internal commotions and securing domestic tranquillity. . . .

Whatever constitutional doubts may be entertained respecting the power of Congress to cut . . . canals, there can be none about the power to lay out and make roads. . . .

I shall . . . give no encouragement to private speculation until it is ascertained that Congress will not . . . pay any attention to it.

I am anxious and ambitious that my native country should have the honor of being the first to introduce an improvement of such immense importance . . . and should feel the

utmost reluctance to resort to foreigners in the first instance. . . . No doubt exists in my mind that the value of the improvement will be appreciated and carried into immediate effect by trans-Atlantic governments. . . .

Whatever may be its fate, should this appeal be considered obtrusive and unimportant . . . or remain unheeded . . . I still have the consolation of having performed what I conceive to be a public duty.

In such arguments as these it is almost impossible to pick a flaw. It is true that in respect of Federal operation our catastrophic lesson of 1917 has left scarcely a boat's-crew of us in agreement with the colonel on that point. Yet it is necessary to recognize a distinct difference between the connotations of "government" then and now. Nothing on a large scale could then be undertaken without Federal aid of one kind or another; what the colonel contemplated is much more nearly represented by our present Interstate Commerce Commission than by any political disorganization of the railroads themselves. His chief object was to make a beginning and let ocular demonstration do the rest. Among scores of men to whom he appealed was his old friend Samuel Mitchell.

New York, June 4th, 1812

Should your attention to the concerns of the nation in respect of Foreign Relations allow you time to give the enclosed pamphlet a perusal, I am confident you will be forcibly impressed. . . . Should your sentiments accord with mine, I have to request that you bring the subject forward, that a moderate sum may be appropriated for . . . making a satisfactory experiment. . . .

P. S. (From my note to the President) Conceiving the enclosed to contain matter worthy of serious attention by the General Government, I now take the liberty of addressing one to your perusal.

What the President thought may only be guessed. Mitchell was much interested, but it does not appear that he succeeded in persuading Congress—of which he was a member—to such serious attention as would result in an appropriation. As might be expected, one of the few real enthusiasts was Oliver Evans, who expressed himself as "highly delighted in reading the correspondence between John Stevens and the Commissioners." In his opinion, the colonel had "taken a most comprehensive and ingenious view of this important subject" and by "his plan of railways for the carriages to run upon, removed all the difficulties that remained." But to Evans, accustomed to the rôle of prophet without honor, the probable stubbornness of opposition was apparent. It was in almost pathetic hopefulness that he concluded it might be "enough for this generation to try canals, the next to try railways, and the next to adopt steam-carriages."

Those who paid no attention to Evans paid very little to the colonel. Disappointed in the attitude of New Yorkers and Jerseymen, he turned to the South, where he had gone in connection with his Carolina steamboat grant. Said "The Richmond Patriot," December 29, 1812:

> . . . Mr Stevens of New York . . . now at the Eagle in this city . . . purposes making application to the Legislature for a similar privilege [to the Carolina one] and also for laying out and establishing Railways, on new principles, for transporting, in carriages propelled by steam, produce, merchandise, &c, to and from navigable waters. . . . Should he succeed, he contemplates forming a company to run Steam Boats from the head waters of the Roanoke to the falls, and from thence, by . . . Railway . . . across to tidewater at Petersburg.

Plans for Virginia were discussed with Captain Harry Heth, chief coal-dealer of Richmond and leading citizen of

Black Heath in the coal-fields. His "waggonage" during a year amounted to 800,000 bushels, for hauling which he was paying nine cents a bushel. Estimating that a railway would cut this charge to about half a cent a bushel, the colonel left an account of his visit to Richmond.

That I might inform myself fully on every particular relative to the coal mines . . . I spent a week there . . . in the examination of the different works. . . . The coal-pits, already opened, cover so large a . . . surface that there can be no apprehension of their ever being exhausted. I then spent part of three days in exploring the best practicable route from the coal-pits to the . . . waters of the James River.

The present route is by turnpike . . . to Manchester. The water will not admit of the navigation of . . . vessels larger than schooners or small brigs. . . . Five miles below is a landing . . . Warwick. . . . This was, on every account, the most eligible site for the termination of a railway from the coal-pits. . . . The water . . . would admit ships of any burden . . . and the distance from the coal-pits nearly the same. . . . I found the ground between . . . pits . . . and . . . landing a gradual inclined plane, with only one small ravine intervening; the difference in elevation, between [them], as nearly as I could estimate, . . . 250 feet. . . . It would appear as if nature had formed the surface . . . precisely to suit the purpose. . . .

By the employment of large vessels, and from the facility and certainty of transporting coals on railways at all seasons, . . . vessels would meet with no detention. As the whole of transportation could be secured, the formation of coal-yards, here and at Philadelphia, would become an object of great profit.

The definite proposition to Heth was that the coal owners should raise $80,000, of which $50,000 would be required by the colonel for building thirteen miles of railroad, using red cedar or locust posts, and furnishing "the necessary machin-

ery, steam-engine and carriage for the reception of the same." The only stipulation was to the effect that Robert or himself have undisputed supervision. Should the experiment fail, there would be no charge whatever; should he succeed, he promised a saving of $100,000 over the cost of "railways on the ordinary construction." But Virginia's coal-barons were no more ready than their northern competitors to accept the novelty; the enthusiasm of Heth was not enough to prevent the project from languishing.

In the face of indifference, the colonel remained philosophical. Discussing his plans for improving the navigability of the Susquehanna with W. J. Duane, he told the latter that "the supineness of your Pennsylvania Legislature is truly astonishing. To bring forward at this time my railways and carriages would be premature. What is required is a portion of disinterested and enlightened patriotism not entirely obtaining in bodies constituted as it [the legislature] is. A fair experiment must be made before I can reasonably expect to inspire confidence." In looking for a chance to promote such an experiment, he found an excuse in the disastrous first year of the war, with its stultifying effect upon steamboats. Hammering away at the idea that New York city must eventually become the "chief emporium of the European market," he stressed "the greatly increased intercourse between that city and Philadelphia." Because of the war, most goods might no longer travel safely at sea but be carted, at great cost, from the Delaware to the Raritan. Under existing conditions, a canal could never be dug; then why not build a railway? To be sure, there were "many other places within the United States where railways might be introduced with advantage." One such would be from the head of navigation on the Bohemia, a river tributary to the Chesapeake, across twelve miles to

the Delaware; another would be from Philadelphia to the Susquehanna at Harrisburg. But neither seemed to him as important as a link between the landing below the bridge at Trenton and the lower landing at New Brunswick, a distance of twenty-six miles. Not only as an experiment for future improvement, but as the immediate means of improving Jersey transportation—to say nothing of his personal ambitions as a Jerseyman—it was here that the colonel ardently wished to lay the cornerstone of American railroads, the mightiest structure on earth.

"This tract of country," said he, "is comparatively level. Not a hill of any consequence intervenes, even Rocky Hill being to the northward of the proper line." Over this a double road of iron rails could be laid at the estimated cost of $15,000 per mile—or less, if wooden rails were tried. "Should the risk, uncertainty, and delays of a sea voyage be superseded by this cheap and expeditious mode, the major part of foreign foods for the supply of the western country would be brought from New York." On the other hand, farm products such as flour, then selling in the city at a cruel price, could be delivered there far more cheaply. The more he considered it, the better he liked the idea of a railroad in New Jersey as the first one.

He ran the line for that road himself. "Monday, the 3rd of January, 1814," says his journal, "left home for New Brunswick in my own carriage. Paid tolls $2.52." Next day, with rods and chain, he made his "beginning at George Road, at a corner of John Van Noice's fence, S 43 W, 52.50 Ch." The antiquarian might trace that line through many an old Jersey name: Stats Van Dusen, George McKay, Vander Veer, Enos Ayres, and Andrew MacDowel. Saw Mill Brook, the Ridge Road past the Stone Schoolhouse, and on to Cranbury; the Devil's Brook, the Hide's

Town road, and so to Princeton. Up to Rowland's Tavern and the Ten Mile Stone; past the Quaker Wood by Jacob Haw's stable, crossing the middle of the road at John Walker's house; then by Mount's Mill to the Assanpink dam and the Hutchinson Inn at Sand Town. Crossing the Lamberton Road, to finish with "6 Ch. to the river bridge gate, Trenton," the line passed the Steamboat Hotel, where the colonel "paid, for whiskey and cider, $1"—a well-earned drink. While he drank it he reread his plans for financing such a railway.

That there may be no clashing of interest between the Proprietors of the Steam Boats *Phoenix*, *Philadelphia*, and *Raritan*, and the subscribers to the contemplated Rail-Ways, it is proposed that the whole interest of the Steam Boat Line of communication between the Cities of New York and Philadelphia be consolidated into one common stock. That to this end the above mentioned Steam Boats be estimated at a fair price, and that the Proprietors be at liberty to receive the amount of such valuation either in stock or in money, in whole or in part, at their option.

That whenever the nett profits of said concern shall amount to more than 20 per cent per Annum on the capital expended, such excess or surplus, whatever it may be, shall be equally divided between the Stockholders and the present proprietors of said steamboats, and the Patentee of said Rail-Ways; one-half thereof to be paid to said stockholders in proportion to the amount of stock held by each, and the other half to said Proprietors of said Steam Boats and the Patentee of said Rail-Ways, in proportion to the capital vested in each, as a compensation for their respective patent rights.

Since legislative authority to incorporate was necessary, the colonel presently submitted a petition, in which he was joined by what few Jerseymen he could convince. "In times of peace," ran the argument, "the safety, certainty, and regularity which will attend our internal intercourse will

make it of inestimable value. When our country may be involved in war, as at present, with a nation capable from maritime power of constantly interrupting if not destroying our coastal trade, we shall be able to carry on the necessary intercourse between the different parts of our country, safe from the risks of the sea or the power of the enemy, in the very midst of our people with facility and despatch." If truths so self-evident to-day were even recognized when the colonel stated them, the method of establishing them was held to be stamped with dangerous radicalism. What was it to a Jersey legislature to learn from John Stevens that railways were "already numerous in England, Scotland, and Wales," with one, "in the counties of Monmouth and Bracknock, extending a distance of twenty-eight miles"? So little, that the colonel did not dare suggest substituting, for the horse-drawn carts on these railways, his own steam-carriages. Gladly would he have accepted horses merely to make a start.

His gauge of public indifference was accurate. For years the roar of American cheering over each shovelful from a waterway ditch muffled the tapping of British hammers and the hiss of steam in British locomotives. The chance to be first in the field with railroads slipped out of America's hands and was drowned in the canals. Not very long ago, Mr. Samuel Rea, discussing later attempts to break ground for railroads, told how "unfortunately, it was necessary for the country to await the experiments of the Canal Period; to suffer the disadvantage of their operation for only a part of each year; and to see many of them operated to obsolescence within a comparatively brief interval, following the vast expenditures upon them, much of which was a total loss." Thus Samuel Rea, across the century behind him, again shook hands with John Stevens.

The petition failed early in 1814. Soon after this disappointment the colonel wrote to John Gulick, the stage-operator:

Feb. 25th.

Had I met with the same liberality and disinterestedness in the members of the legislative council as you expressed to me when I saw you on my way to Trenton, my railroad would have met with a very different fate. But, although to the eternal disgrace of the state my application failed, I have still another project to communicate to you, which I expect may be carried into effect without legislative sanction, and which will answer my purposes and yours completely. . . . To form a railroad on the east side of Rocky Hill, thence running in a straight line and falling into the old road within half a mile of Brunswick. The distance would be about 9 miles and I believe there are no public roads crossing this line. . . . As the rails would be elevated . . . it would form a complete fence. . . . I should presume there would not be much difficulty in obtaining the privilege from the owners of the land, for a trifling consideration. . . .

Purchase of the ground . . . and forming a horse-walk . . . would bring the expense of the whole up . . . to $20,000. . . . Whilst my bill was before the legislature, I have not contradicted but rather acquiesced in the exaggerated estimates that have been made. . . .

The whole transportation between Trenton and Brunswick would be served. . . . All opposition would be at an end, as no stages would be permitted to use the railroad except those belonging to the proprietors. . . . It would secure, without competition, the carrying of the mails. . . . As the road from Trenton to Brunswick would . . . [thus] be good at all seasons, no detentions could happen. . . .

Interest on the capital would be . . . not one-fourth of the profits and advantages which such a railroad would be worth.

This was one of the many drops which the colonel continually let fall upon the stone of public ignorance and in-

difference. A disappointment in one direction merely influenced him to turn his face in another. Finally, on February 6, 1815—two days before the treaty of Ghent was signed—a great hour struck in his life. The New Jersey legislature created a company "to erect a Rail-Road from the River Delaware, near Trenton, to the River Raritan, at or near New Brunswick"!

This first American Railroad Act had many of the features characteristic of contemporary turnpike legislation. To receive subscriptions a commission was appointed—James Ewing, Pierson Hunt, and Abner Reeder. The capital was limited to five thousand hundred-dollar shares, on each of which a deposit of five dollars was required when subscribing. When two thousand shares had been taken, the commission was authorized to call a meeting of subscribers for the election of a president, eight directors—"five of whom shall constitute a board"—and a treasurer. Thereafter, elections were to be held on the first Wednesdays in November, ballots, in person or by proxy, to be at the rate of one vote for every share, not exceeding twenty; one vote for every five shares between twenty and fifty, and one vote for every ten shares above fifty. Temporary vacancies in the board were to be filled by the board itself, but members otherwise to serve for one year. All the corporate powers were to be in force for fifty years, but if its terms were not carried out within ten years, or if the works were allowed to decay for two years, the charter was to become void.

To lay out the road itself, a second commission was created—John Rutherfurd, Mahlon Dickerson, and Richard Allison—who must have "due regard to the situation and nature of the ground and the buildings thereon, the public convenience and the interest of the stockholders, so as to do the least damage to private property." The road was not

to pass through any burying-ground, place of public worship, dwelling-house nor outbuilding to the value of $300, without the owner's consent. The commission might enter upon any land for "stone, gravel or sand for said road," but might not take this away without paying for it. Elaborate reports must be submitted to the State.

The charter said nothing about the kind of motive power to be used. It merely stipulated that the wagons and carriages should be constructed and moved on the road "in conformity to such rules as the company shall make from time to time." Power was granted to "make, erect, and establish a railroad, passing and repassing, which road is to be composed of either iron or wood for the running of the wheels; the running part to be fixed on a solid foundation, impervious to frost, not liable easily to be removed." In order that it might "be good at all seasons of the year," the middle of the road must be of some hard substance—either stone, gravel, or wood. A particular feature was the prohibition against obstructing any public road; over these the company was required to build causeways under penalty of ten dollars for each day of neglect. By right of domain, the company might erect all necessary "works, edifices, and devices," and, for any damage to these, collect three times the value of the harm done. It might also purchase "lands and tenements," the price of such to be determined, if necessary, by arbitration.

When not less than ten miles should have been completed, the governor was required to appoint three disinterested persons "to . . . determine the rates and charges . . . for the transportation of merchandise and . . . every article of country produce, lumber, and fire wood . . . ; also . . . such tolls and rates as the . . . company may receive from all persons travelling the road." Every ten years, when the

"JOHN BULL," BUILT BY ROBERT STEPHENSON FOR ROBERT STEVENS

company was required to lay its financial condition before the legislature, the rates were to be subject to revision. There was, however, a stipulation that rates should never be set so low as to prevent a 12 per cent. dividend to the stockholders.

Though a little different from its countless offspring, this original Railroad Act was comprehensive enough for its age and day. Too much so, perhaps, since what the colonel called the public's unenlightened mind was not up to understanding its broad possibilities. This applies particularly to the original commissioners, of whom, indeed, only Mahlon Dickerson appears to have had any great standing. It would seem that a man who was chosen governor of his State in this very year, and who successively became United States senator, minister to Russia, secretary of the navy, and Federal judge, might have caught the colonel's vision and pushed his efforts to fruit. Possibly these very activities distracted his attention; why else should he have written the colonel, years afterward, as if the whole idea were new to him?

1830

Your memorial I transmitted to Mr Van Beuren & your pamphlet to the President. I have not since had an opportunity of talking with either of them. . . .

Your pamphlet will at some future day be a curious document to shew your opinion upon railroads & Steam Carriages as early as the year 1812.

Colonel Stevens was irritated by the general blindness of 1815 to the inevitable future. He castigated it as a merely obstinate conservatism. For the moment, however, he allowed the question of railroads to rest, while he found an outlet for his energies by joining his sons in the new line of endeavor just opened by them.

CHAPTER SEVENTEEN

Dec. 26th, 1814

His Excellency
Governor Dan'l D. Tompkins,
New York.

Sir:—

I have the honor to inform you that I have just made an experiment with one of Colonel Stevens' elongated shells, which was fired from a 24 pounder at a Target of timber 200 yards distant with three pounds of powder. The shell penetrated the Target, as well as we could judge, about halfway; and in about five seconds burst and completely destroyed the Target, altho' it had been strongly connected with iron bolts.

Jas. House,
Lt. Col. Art.

When that twenty-four crashed into the target and, for all the iron bolts, destroyed it, John Stevens opened a battle which he was to wage for the rest of his life—the fight to give America an armored, mobile fleet, with the choice of time and place in meeting an enemy, with the heaviest and most effective guns afloat. Up to date the echo of that shot is no fainter than the echo of the first volley at Lexington; each, in its way, began a revolution. Old-fashioned, blundering round-shot, harmless at any considerable range and, even at point-blank, apt to bounce off weathered sides, became things of the past—mere bricks to build monuments at the corners of village greens. The elongated shell took its place as the forerunner of to-day's seventeen-hundred-pound, armor-piercing, high explosive projectile, common to the fleets

of the world. Since some one had to take the first step, why not John Stevens?

The colonel himself always credited the shells to Robert, merely using his own position as the elder man to push their completion and ultimate adoption. In the main they were Robert's. But Robert long since had formed the habit of taking fire at the flame of his father; in this, as in so many later inventions and works, Robert developed an idea of his own by discussing it with the colonel; or, *vice versa*, caught the colonel's vague theory and gave it practical realization. The two can afford to divide between them this particular design—not forgetting that Edwin also was a contributor to it. The early history of the shells is most simply told in letters, one of which the colonel wrote Governor Tompkins soon after House made his report. Enclosing a copy of the artilleryman's official communication to Washington, the colonel's letter continued:

I have delayed the above until I could make further trials; and have now the pleasure to inform you that yesterday, in the presence of Gen'l Boyd, Com. Decatur, Cap. Porter, Col. House, Doctor MacNiven and several other Gentlemen, four more shells were discharged at an entire new target . . . resembling, as nearly as might be, the side of a 74; consisting of strong oak timbers one foot thick, set up perpendicularly in the ground close to each other; across which, on both sides, were strongly spiked and bolted oak planks of four or five inches thick.

Owing to a miscalculation respecting the length of a fuse contained in the interior of the shells, which it was expected would burst four or five seconds after the discharge, only one shell reached the target before explosion; but the effect of this was amply sufficient. The shell pierced about halfway thro' the target, and, in a second, exploded with a report nearly equal to that of the cannon, which was a 24-pounder charged with about 3¼ pounds of powder.

Two of the plank behind were forced entirely off; in front, from the bottom—near which the shell entered—to the bottom, the spikes were all started. What was most extraordinary . . . one of the pieces of oak timber was broken in two. . . .

These experiments . . . have established four important objects:

1st. That the ball may be directed with, at least, as much accuracy as a round ball. I believe much more.

2nd. That, by lengthening the Fuze, the time of explosion may be extended to any length.

3rd. That the Fuze may always be ignited with certainty.

4th, and what crowns all, that the effect of the explosion on the ship's side must necessarily be tremendous; the thicker and stronger the sides, the more destructive will it prove.

Within a few days, the colonel forwarded to President Madison the certificates of Decatur and Porter, with some comments of his own.

If I do not grossly deceive myself, these shells are calculated to produce, ultimately, an entire revolution in naval and military tactics. A few heavy guns will be sufficient to afford complete protection against any naval armament whatever. . . . Each shell will do as much execution as twenty round shot. . . .

A Columbiad would discharge shells containing at least 20 lbs of powder. With such powerful means we would soon, I trust, be able to regain our lost supremacy on Lake Ontario and prevent the enemy . . . from ever wresting from us that on the other Lakes. On the seaboard, by concentrating our dispersable force as much as possible and attacking the blockading squadron, a great impression might be made. . . . Should Government be disposed to think favourably of these shells, every exertion will be made to furnish any number. . . .

That your Excel'y may be apprized of the cost . . . I transmit Mr McQueen's account for casting and fitting up the five experimental shells. But, be the expense of them what it may, if one will be as efficient as twenty round shot, they will prove vastly more economical. . . .

No specific charge will be made for the services of myself or my son, to whose ingenuity and perseverance the public will be principally indebted for whatever advantages may result. . . . We shall ask no further compensation than a moderate percentage on the value of the vessels and property which may be captured or destroyed in consequence of the use of these shells. . . . Should this principle appear just, I trust it will be recommended by your Excel'y to Congress. . . . Should the percentage be in any degree proportionate to that allowed for the destruction of enemy ships by means of torpedoes, we shall be perfectly satisfied. . . .

To furnish an adequate supply will take some time. . . . It will be highly important to know as soon as possible what number may be required. . . . An advance of 5 or $10,000 will be required for the purchase of materials. . . . The Corporation of the City of New York would, no doubt, make the advance, if applied to by Government.

There is no record of any reply from President Madison, but Captain Samuel Evans of the New York navy yard shortly had orders from Acting Secretary Crowninshield to "afford the means to Colonel Stevens of making experiments," which were continued at intervals throughout this summer. Tests of various guns, from 18- to 100-pounders, were so satisfactory that the navy ordered 1250 shells, while the army, on condition that more tests be first made, took 3750. Summed up, the later tests showed progress:

Out of nine shells fired, none burst in the gun, the explosion taking place not less than ten seconds after discharge.

Direction was remarkably good; on the whole, better shots were made than usually done with round shot.

From spiral creases, made by rubbing against spikes or bolts in the target, the rotary motion of the shells was evident. This was confirmed by the rectilinear course of such as ricochetted on the water.

Three shells that pierced the target without exploding were

judged, from the holes they made, to have entered point first and then turned sideways, without injury to themselves.

The elongated form lessened the resistance to the air, greatly increasing the range.

No effort to explode the shell, except by gun-fire, succeeded.

Emersed for a considerable time in water, the shells proved to be hermetically sealed.

Of six shots, fired at a target 430 yards distant, three were in direct line with the center. One was one foot nine inches to the left; one was six feet to the left; and one was two feet two inches to the right; all pronounced "very good shots."

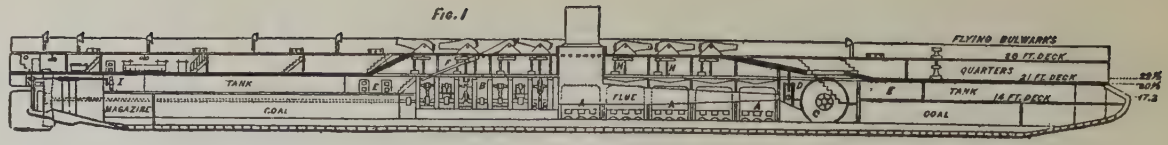
When the colonel, Robert, and Edwin studied these results, their minds leaped forward in the next logical step —armored ships. If their projectile could knock a seventy-four to pieces, the obvious rejoinder by any potential enemy of the United States would be an indestructible vessel. The evening conversations on the top of the Hoboken hillside soon turned to the conclusion that it would be better for the United States to build the first such vessel; better that she be designed with her machinery and vitals protected; and, therefore, better that screw-propellers be used to drive her. Of all this the colonel had much to say in a letter to Stephen Decatur.

April 29th, 1815

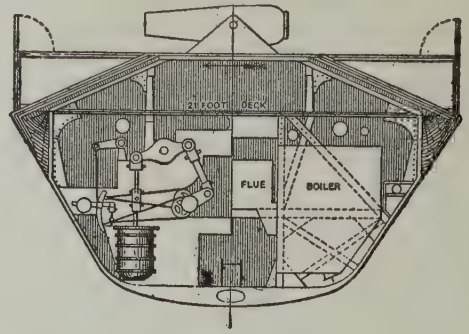
When I met you last, I intimated that I had contrived a shot-proof vessel to carry a Columbiad for firing shells into the sides of ships-of-war and, notwithstanding the objections you urged against my mode of propelling her, I still think it very much superior to that described by you and which you informed me had been adopted by Mr Fulton.

One of the defects of the steam engine now in use is the loss of power necessarily sustained by the conversion of a rectilinear motion into a rotary one. To have resort then, of choice, to the converse of this—viz: converting a rotary motion into a rectilinear one, would argue a gross violation of mechanical principles long understood and established.

Fig. 1

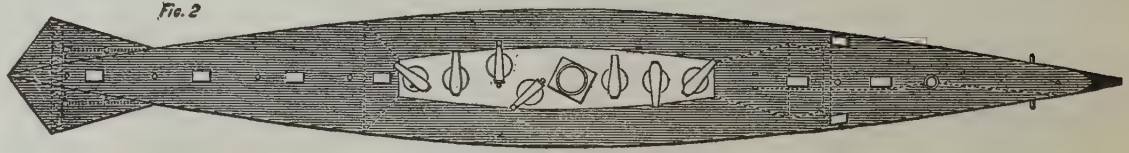


ELEVATION



CROSS-SECTION

Fig. 2



PLAN

THE STEVENS BATTERY

You contend that the muscular force of men can be exerted to better advantage in shoving and pulling backwards and forwards in a right-line than by turning a winch. This I conceive myself fully warranted in pronouncing a mistaken idea. . . . Whether a common water-wheel, or a spiral after the manner of a windmill is the most advantageous application of power I will not now undertake to determine. . . . It is sufficient for my purposes to have satisfied myself, by actual experiment, that the loss must be very trifling.

The results of repeated experiments between common oars and a light frame wheel are in favor of the latter. A number of other considerations, which would occupy too much of your time for the object now in view, give the spirals a decided superiority over the common water wheels. The perfect security against shot afforded the former, by their *total submersion*, is a consideration of the utmost importance.

On what are the merits of the project of the Gentleman at Baltimore for throwing a stream of fire, it is not for me to presume to pass an opinion. . . . I merely observe that, as it is novel, it will require experiment. . . . I would beg leave to intimate to you that I have also conceived a project for setting ships on fire; it would be premature to enter into details until I have tested the efficacy. . . . If successful, I should propose that the Government make trial of shot-proof vessels, on my plan, for the Mediterranean service. They would combine, in a superior degree, the objects contemplated by the Gentleman with the advantage resulting from the use of elongated shells, which may be thrown from a Columbiad to a distance of perhaps nearly four miles and, at a distance of half a mile could be directed against even a small object with absolute certainty. . . .

In the construction of the vessel itself various improvements are adopted, of which I shall at this time abstain from making a particular explanation.

For the Mediterranean, what the colonel planned was a seventy-foot craft, capable of being carried on board a frigate. It was to be made shot-proof by thick plank, covered

with plate iron, to mount one Columbiad, and to be "propelled by men, by means of a spiral water-wheel in the stern." A steam-engine, he felt, could not be got under way promptly enough to provide for an emergency attack. "Ten or a dozen of these," he wrote, "after passing by the castle at Algiers, would soon demolish every ship of war anchored or moored" in the harbor. Moving relatively fast, they would be but briefly exposed to fire from the forts. He spoke of the "glorious termination" of the war with the greatest naval power in Europe as an indication of what would be expected from the United States in the future, "when all eyes will be turned upon us." Should we now succeed in destroying the naval force of the Algerians, we should probably settle them for ages to come. "But," he concluded, "we shall do more! We shall heighten the reputation and respect we have already acquired, and thus guard against future insult and aggression." The colonel could be depended upon for anything to help the Eagle scream.

In the fall of this year he again covered all the shell experiments in a letter to Madison, adding the conclusions which he thought established. He visited Washington for this purpose.

Nov 8th, 1815.

. . . The report of the experiments . . . I had the honor to put into the hands of your Excellency yesterday. . . .

It may be thought that the great expense would be a serious objection to the use of these shells extensively. . . . Should they give our naval armaments an overwhelming superiority . . . the expense, were it tenfold greater, becomes an object unworthy of serious attention. . . . The destruction of a single line-of-battle ship would more than compensate for the additional cost. . . .

It is the most earnest wish of my son that the advantage resulting . . . may be exclusively reserved to his beloved na-

tive country. . . . Should, however, a war break out between any European powers, he might possibly be tempted by high reward, unless previously restricted, to communicate his secret to one of them. . . .

Happily, the construction and mode of adjustment are by no means obvious and would probably not be understood even were an enemy to become possessed of an entire shell. The secret has been communicated only to Commodores Rodgers, Porter, and Decatur—even the workmen have no conception whatever. . . . I add the estimate of charges.

This letter was soon followed by a petition to Congress, inspired by the colonel's learning of a bill just proposed. The bill would authorize the President to buy steam-engines and materials to equip three steam batteries for the defense of Chesapeake Bay and other points, as well as to "keep in the best state of preservation the block-ship now on the stocks near New Orleans." In his memorial the colonel represented himself as in possession of a plan "calculated to embrace completely the objects contemplated," with the important additional advantage of providing "cheap, facile, and expeditious" transportation from Providence to Savannah. He begged that he be given a hearing *in camera* on the details, because certain parts should be kept from public knowledge. What he planned was a combination of iron-clad steam vessels, for either commercial or military use as occasion demanded, with the railroads always so close to his heart. The note he made upon his copy of this petition ruefully states that it was "referred to the Committee on Naval Affairs, where it came to naught"—a result to which the years would make him accustomed but never reconciled.

As to the ships themselves, he went into more detail in a letter to James Pleasants, then chairman of the very committee which was to pigeonhole his suggestions.

In the main, with some reserve, they should be built on the common plan of frigates; drawing, however, less water. The machinery, as well as propellers, so constructed as to be wholly below the surface of the water. They should be impelled, by the machinery alone, at least seven miles an hour.

As it is calculated to fire shells, instead of balls, they would carry fewer guns, though of larger calibre. The weight of metal would be decreased but the powers of destruction increased tenfold.

With your leave, I will state my objections to the frigate . . . already built at New York. By placing a water-wheel in the middle, she is . . . necessarily made [with] an extreme breadth of beam . . . separated into two vessels. To connect . . . sufficiently strong, these twin-vessels, a mass of superfluous timber becomes necessary. These, in addition to bulwarks for the defence of her machinery, render her so unwieldy and heavy that, even with an engine pre-eminently powerful, she goes through the water—even when smooth—at a very slow gait; . . . from her construction, she must be pronounced . . . unfit to encounter a common sea in the open ocean. . . .

She can neither pursue nor avoid an enemy. . . . She is merely a floating battery with very limited powers of loco-motion, and it is always in the power and at the option of an enemy—unless becalmed—either to attack or to avoid her. . . . A steam frigate, infinitely more efficient, can be built and completely fitted for less than half [her] cost.

The steam frigate of which the colonel found so little of good to say was the *Demologos*, built from the designs of Fulton. Without doubt, the colonel was a prejudiced critic, but it is a fact that this craft had a tough time of it at sea.

As to shells, negotiations with the War and the Navy departments dragged on, these bureaus, though smaller, being no less impersonal and tape-bound than those now familiar to us. Weeks were consumed in fruitless visits to

Washington, where Robert and James were still struggling when the colonel wrote James on Christmas day, 1816.

Yours of the 20th inst. I received yesterday, and was truly mortified at the contents, although I had . . . anticipated what has taken place. The reference of the business to the ordnance department is an act of downright hostility. Colonel Bumford, as was . . . to be expected, has . . . done everything in his power to defeat our purpose and prevent any contract being made. . . .

The objections raised by Colonel Wadsworth are founded on ground never contemplated. . . . The conduct of the parties all around indicates . . . a disposition to force Robert to dispose of his invention for a song. . . .

From the complexion . . . at the date of your letter . . . I do not apprehend . . . a speedy issue. If no change has taken place, it is my opinion . . . it would be to no purpose to remain at Washington any longer. . . .

My present impressions are that . . . you return immediately to Philadelphia where, on notice, I will meet you on any day you appoint. . . . We can hold a consultation with Mr Binney . . . and, if it should be thought necessary, I will return with you to Washington. Nay! If it should be deemed expedient, we will take Mr Binney with us, if he can be prevailed upon. . . . We should then, I apprehend, present so formidable a front as to drive the whole corps of artillery off the field, with the ordnance department at their head! . . .

It only wants a proper degree of energy, weight, and decision, to carry this business successfully through. To produce an adequate impression, high ground must be taken which, perhaps, might not appear quite so decorous in two such young men. . . . Do not fail to answer this immediately. . . . Preserve this letter, as I have no copy.

Having received from Robert a copy of Colonel Wadsworth's letter to the secretary of war, Colonel Stevens promptly forwarded his comments upon this to William H.

Crawfurd, formerly of the War Department but by this time secretary of the treasury.

Col. Wadsworth says "the elongated shells are calculated to obviate the principal objections against the use of shells on ship-board." He does not specify what objections, but I presume he alludes principally to the want of safety. The various trials . . . have placed beyond all possibility of doubt, the *perfect* safety attending their use.

Is not this . . . quality nearly, if not quite, equally essential in a battery against shipping? For want of this . . . and other insurmountable difficulties, the substitution of shell [for] ordinary shot has hitherto proved impractical. . . . Admitting that Col. Wadsworth is correct in his *strong persuasion* that "round shells from 24 P and 32 P would be *quite* sufficient to do irreparable mischief" yet, if they cannot be used in cannon in the same manner, and as a substitute for round shot in the same service, I doubt the justice and propriety of Col. Wadsworth's *firm belief*, that . . . the necessity of using elongated shells would *vanish* as respects the land service. . . .

If Col. Wadsworth's meaning is, to use round in place of elongated shells, without adopting the mode of ignition, it is notorious his project must fail. But, should it even be his intention to adopt this indispensable improvement, still his project would prove impracticable; a certain degree of cylindrical form being essential. . . .

It seems he wished that farther experiments might be made, which "would afford him *personally* great satisfaction and be of permanent use . . . to clear up and settle some questionable points." What these *questionable* points are, is not so much as hinted at. . . . The experiment he is desirous of making has already been tried in a mode much more satisfactory than the one he proposes. . . . The result was that the shells ranged considerably farther than the round shot, with direction nearly equally good. . . . But the ranges, he says, "ought to be extended to 1500 yards or a mile." To what end? If, in half a mile and upwards, the shells carried farther, what reason . . . to suppose the results would be materially varied in a mile?

With . . . six pds of powder and an elevation of 4 deg., we find the shells ranged very nearly three quarters of a mile. They made ricochets repeatedly from the surface of the marsh and some of them buried themselves at a distance of a mile and a half. It is presumed they will go farther, if fired over water. From a Columbiad, with a short shell of little more weight than a round shot, I have no doubt a ship may be struck at a distance of three miles.

The account he gives of a ship being struck by a shell from a Howitzer, is a proof in point of the very important utility of these shells in "the land service." A ship underway and passing a battery with a leading breeze would remain but a short time exposed. It would require the heaviest metal and the greatest possible expedition in firing, to produce the desired effect. For these reasons, the batteries for the defence of harbours ought to be mounted principally with the heaviest cannon now in use. If some could be cast still larger—so much the better. This, it will be said, would incur a heavy expense. But when the object is to . . . *insure* defence against . . . ships-of-war . . . for such cities as New York, Philadelphia, etc. . . . to suffer expense to have influence . . . would surely be ill-directed economy. . . .

The following is an extract from Robins. "A mortar for the sea-service, charged with 30 pds of powder, has *sometimes* thrown its shell of 12¾ in. diameter and 23 pds weight, to the distance of 2 miles at 45 Deg." By an experiment . . . the 18th of June, 1815, at Governor's Island . . . a Columbiad, or 100-pounder fired a shell at a target 80 yards from the piece. The shell, including 13 pds of powder with which it was charged, weighed 190 pds. The calibre of the Columbiad is nine inches. . . .

It is highly probable that a shell from a Columbiad would ricochet to three miles or more. The shell of the latter contained 13 pds of powder, against 9¼ pds for the mortar.

Col. Wadsworth concluded with suggesting that "it might be as well to leave their merits to be fully tested by the officers of the Navy, before deciding upon this introduction into the land service. . . ." One would suppose that the Secretary of War was about to introduce some dangerous innovation "into

the land service." The effect of a shell fired from the Columbiad, according to Col. House's report, was "truly tremendous." From the ordeal they have undergone, it is proved that, from negligence or accidents, no mischievous effects are to be apprehended; in the hurry and confusion of action these shells can be handled, and the pieces charged, with as much *safety* and *expedition* as round shot; their explosion, in a given time, is reduced to almost a certainty; and their range and direction are at least equal. To what purpose make further experiments? None, that I can see, unless, as Colonel Wadsworth has suggested, "to afford him personally great satisfaction."

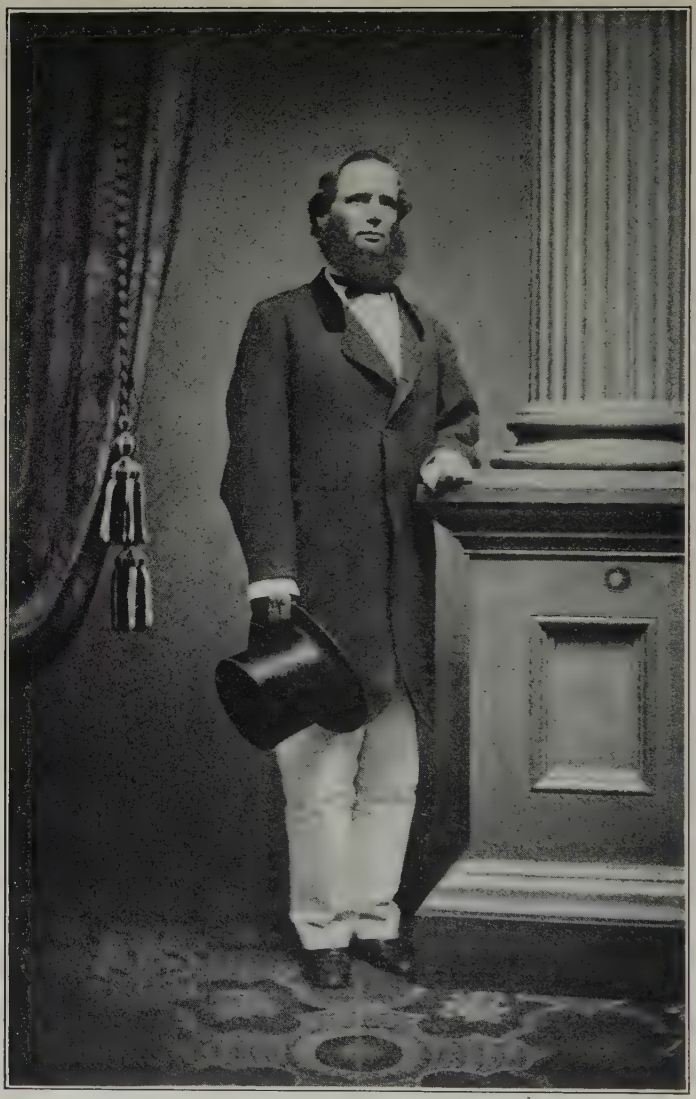
Throughout the spring and summer—more talk and more delay. Growing impatient, as he always did when his plans hung fire, the colonel thought Washington might be hurried if he opened negotiations with some foreign power. As one quite unlikely to go to war with the United States, he chose Russia. In September he sent a long memorial to the czar through Count Lievin, Russian ambassador at the Court in St. James's, and received the count's promise to forward it at the first opportunity. The actual proposals were those which the colonel had already laid before Daschkoff, Russian minister to the United States, embodying the suggestion that steam frigates and, if desired, the small propeller-driven boats be built. In the first frigate finished, the colonel offered to embark for Russia, there to stay until the czar was satisfied with the trials of her machinery and guns. If this service were accepted, he set a figure of $200,000 upon his personal attendance, plus—in case Russia should go to war—a 10 per cent. commission on the value of all ships destroyed by his frigates. If he were "honored by an assurance from the hand of the Emperor himself," this would inspire him with such confidence that he would require only "a moderate compensation" until the experiments proved successful.

To answer the anticipated question why he was not supplying frigates and shells to his own country, he remarked that this was due to "the indecision and procrastination which naturally pervades and benumbs all the movements of a Republican Government." Even so, he declared, he would not be making the offer to Russia unless there were "every reason to expect an uninterrupted continuance of the amity at present subsisting between the United States and herself." Then, adding a summary of all the experiments made with shells, but not revealing the secret of their construction, he took the liberty of flattering himself that, in suggesting one way in which Russia might use his ships and his guns, he did not "sin beyond pardon."

"The expulsion of the Turks out of Europe," he wrote, "would not only redound greatly to the glory of the Russian Empire but be incalculably beneficial to the whole civilized world." Venturing to suggest how this might be accomplished, he proposed building a fleet on the Black Sea. A few ships having "drawn out the enemy" by attacking Varna, the main body could then swoop down upon Constantinople, secure the Bosporus and starve out the Turk. Language having its way with him, he exclaimed over the "Turkish Empire rent in twain."

> Glorious indeed would be the spectacle! To view this classic ground, once the seat of art, science, and civilization, but now for ages past groaning under the execrable yoke of Mahomet, rising like a Phoenix from its ashes and, under the fostering wing of an Alexander, resuming and perhaps surpassing its former splendours!

It was his hope that Russia might employ these means "not in the conquest and devastation of surrounding countries . . . nor in establishing a vile monopoly of commerce,



FRANCIS BOWES STEVENS

subjugating distant regions to be immolated at the shrine of mercantile avarice . . . but in the exercise of a benign and enlightened policy of friendly and mutually beneficial intercourse with all the nations of the earth." Further, he drew attention to the possibility of using his frigates against the "vile nest of pirates in the Mediterranean, now committing the most shocking outrages in the Atlantic." As a climax, he touched upon the great good to Russian internal commerce, the great facility in handling mails, and the increase in the security of the empire, which would all result from the adoption of another plan that he hoped for an opportunity to present—steam railroads.

All this was expecting a great deal of Russia. Three copies of the memoir went forward, the second through Richard Rush, our minister to Britain, and the third to young Richard Stevens, the doctor, "attached to the United States Frigate destined to the port of St Petersburg with his Excellency Campbell, Plenipotentiary from the United States." Dr. Richard was to furnish the czar with any details required, but Alexander I never sent for him.

Whether or not the Russian idea had its effect during the winter, it is at least certain that Robert made some headway with Washington in the following spring. But the colonel did not approve of making any concessions. He wrote to Robert:

Feb'y 17th, 1818

. . . James . . . tells me . . . you have offered to make a contract for 3200 shells, and that you expect Government to close. . . . I wrote you my opinion . . . not to budge an inch from your original offer. . . .

Since you have receded so much below it . . . you ought not to bind yourself . . . so as to deprive yourself of reaping any further advantage. . . .

Suppose the Emperor of Russia should . . . offer $200,000

for the privilege of using your shells, would it be fair that Government should debar you . . . for so trifling a pittance? For, even supposing the worst, that the secret should be laid open to the world, still your native country would derive an immense advantage from . . . these shells in land batteries against shipping. Seaport towns would . . . be impregnable . . . a service more valuable than the small profit on so small a number of shells.

To give the Government an absolute monopoly for so slender a compensation would be . . . a bargain miserably lop-sided. . . . I would never consent to a contract so glaringly unequal. . . . Although no consideration should tempt me to communicate the secret . . . to Great Britain or France without the approbation of Government, still, should an offer be made by Russia, I would never suffer myself to be debarred. . . .

Should the contract be not yet signed, I earnestly entreat you to come on to Phila. Congress will not rise till May. . . . I pledge myself to make Govt. adhere to your first terms, or to consent to a negotiation with Russia. . . .

In this case Robert did not agree with his father; within a week the contract was signed, February 23. Its substance provided that Robert should deliver "to the order of Lieut-Col George Bomford," two thousand shells. Two hundred were for eighteen-pounders, twelve hundred for twenty-fours, and the remainder for thirty-twos. An alternative for eighteen-pounders, in case larger shells proved desirable, was to be the same number for either eight-inch howitzers or ten-inch mortars. A complete description of the shells and their preparation for firing was to be furnished by Robert, "enveloped and sealed under a parchment, placed securely in a copper box, with a good lock affixed thereto; which box shall be forwarded by one conveyance, and the key by another." He bound himself not to reveal to any one "more than absolutely necessary" of the secret of manufacture, and particularly agreed not to furnish any foreign power with

"elongated shells or any engine of war similar thereto." Also, it was distinctly stipulated that no member of Congress was to have any share in the manufacture or profit. Oddly enough, although he must consent to "any restrictions imposed by the U. S.," Robert was allowed to retain the right, in case of war, to use the shells himself!

The cost of the shells to the Government varied from $20.90 to $26.40, with an appropriate reduction if as many as fifteen thousand should be ordered. The procedure for testing was much what it would be to-day. Six shells, "taken promiscuously from any one part or parcel," were to be filled and fired. If they failed to explode, Robert, provided they came from the first delivery, was to be allowed to replace them. If from a later delivery, however, he was bound to refund to the United States any money he had been paid.

Under this contract, Robert made and delivered shells. Experiments continued for several years, during which the colonel and Edwin worked upon a way to stop Robert's progress in knocking down targets as fast as they were set up on an improvised "proving-ground." It was to Bomford that the colonel reported results, March 27, 1820:

> In my plan for rendering steam vessels impenetrable to the fire . . . from ships of war . . . I would propose to place one gun of large calibre nearly in the centre, pointing immediately towards the bow. . . . The bow must be always presented to the enemy. . . .
>
> To protect the bow, I propose to place a platform of solid oak, on an inclined plane at such an angle as to give a rise of four or five feet in 20 inches. . . . In front of the gun, for the width of four or five feet, the platform . . . to be suspended on trunnions, so as to raise and depress the end in any way we wish. . . . When the gun is charged and ready to fire, the forward end of the screen must be raised . . . so as to in-

cline in an opposite direction . . . to permit the discharge, when it must be immediately restored to its former position. . . . I will now give you the details of some experiments. . . .

I placed on the ground, at about the angle mentioned, three pine plank . . . 18 feet long, three inches thick, and . . . a foot wide; on these were placed ten bars of iron, 2½ inches wide, ½ inch thick, 14 feet long. The target was 70 yards distant from a 32-pound cannon . . . charged with 8 pounds of powder.

At the first fire, the ball struck within a few inches of the ends of the bars, carrying away a short piece; pierced the plank, and rebounded. We then fired again, depressing the gun but not making allowance for [its] being heated. The ball struck the two middle bars, about a foot from the ends and, after passing over them about 6 in. and bending them, it broke off from each about 6 or 8 inches. . . . Piercing and breaking the plank, it rebounded.

I then changed the materials and construction . . . substituting oak of nearly 5 inches thick . . . on sleepers and 14 feet long. The gun was charged with 4 pounds powder. I was not present. My son, conceiving that some allowance was to be made for the difference of charge, again gave the piece too much inclination. The ball struck the two middle bars, 1½ in. from their ends and, although some part of these ends were broken, the ball rebounded without piercing the oaken pieces. Here my experiments are arrested at, to me, a very interesting juncture—not having any more ball.

More experiments will be necessary and my chief object in troubling you . . . is to procure an order on Captain Hayden for a small supply of 32 cannon ball.

Up to this time the navy had spent, in collecting "steam engines and imperishable materials necessary for building and equipping three steam batteries" of the general type of the *Demologos*, $223,525. Based upon this official figure, Colonel Stevens made an estimate of the total cost—including 10 per cent. for "unavoidable contingencies"—at $600,000, more or less. Writing to President Monroe on

October 28, he represented this sum as excessive in view of what would be obtained for it. Pine boards, for example, ought not, in his opinion, to be regarded as "imperishable materials." Moreover, he argued that the proposed vessels, when finished, would not be mobile warships but "mere floating batteries which could afford auxiliary aid to land batteries in but three of our harbours," while each "one of these arks would take as long to finish as a ship of the line."

> My plan [said this letter to Monroe] is . . . to construct such steam engines, of various powers, as may be adequate . . . placing these . . . whenever occasion may require, on board of such ships, tugs, schooners, and sloops as may always, when wanted, be readily procured. . . . It would be necessary to have in readiness only the engines. . . . The copper, whenever wanted, could be purchased and the boilers finished and placed on board, in a few weeks. . . . The whole immediate expense . . . for fifty such engines . . . would be five hundred thousand dollars. . . .
>
> The propellers, machinery, and ordnance will be completely protected. . . . These vessels will be propelled by machinery alone at . . . more than seven miles an hour . . . have it in their power to advance or retreat as circumstances require . . . and [be able to] concentrate their whole force against a single ship. . . .
>
> Suffer me to suggest . . . recommending a suspension of . . . expenditures for "procuring steam engines and imperishable material" . . . and an appropriation of . . . say Forty or Fifty thousand dollars for . . . equipping completely a steam vessel of 150 to 300 tons. . . . Should such experiment . . . prove satisfactory, it would then be for Government to determine the propriety . . . of prosecuting further the plan proposed.

Among many similar letters, one went to John Taylor, speaker of the House, and another to John Randolph. The

colonel addressed Randolph because, he said, the "fearless independence of [your] Congressional career" had emboldened him to think Randolph might be disposed to "*feel* the temper of the House" in regard to steam frigates. It was evident that the plan had "excited jealousy and alarm among the Navy Commissioners" and this was "naturally to be expected." Would not Congress, however, recommend an experiment and—although this might be unusual—make a small appropriation without waiting for an executive request for the money? Once tried, the experiment ought to convince.

Thomas Cobb of Georgia was another representative appealed to by the colonel, this for the reason that Cobb had just introduced a resolution calling for reduction of government expenditures. Here, in the colonel's view, was a way to accomplish this saving. Let the small vessels appropriated for at the last session, to fight pirates, be fitted with engines, and let the result speak for itself. In this way, perhaps, could be rescued the colonel's former petitions and letters which had been, he said, "referred to the Commissioners of the Navy and, of course, committed to the Tomb of the Capulets." Cobb, in reply, promised that if the plan were "found worthy of trial" and would save money, he would support it.

These letters filled the rest of the year. In the middle of January, Taylor sent the colonel the names of the Naval Affairs Committee—Barbour, Fuller, Warfield, Case, Hall, Dennison, and Crawford—with a copy of their report. As expected, this was short and merely intended to transmit to the House what the Naval Commission, headed by John Rodgers, had recommended. In those days House committees believed that naval officers were, or should be, experts in their own line, whose recommendations could be accepted.

There appears to have been little argument over Commodore Rodgers's report.

The commodore fired at full broadside at the colonel's plan. Primarily, he resented the suspicion that he and his colleagues had not been strictly within the law in buying "imperishable materials"—a resentment sufficiently justified had the colonel ever made exactly that accusation. Next, Rodgers insisted that efforts had been made to get, through newspaper advertising, proposals and plans from those interested.

> Few plans [ran the report] were offered; and none that the Commission would approve of; among them was one from R. L. Stevens, a son of J. Stevens and a man whom the Board believe to be of great mechanical talents. . . . Persons known to be of the first abilities in Naval Architecture and Science were employed to form a model . . . which should unite all the improvements within the knowledge of the Board, be free from all the defects found in the others, and as complete in every respect as possible . . . [This] was adopted as the most suitable for the Steam Batteries. . . .
>
> The model is entirely different from the first steam battery which was built at the suggestion and under the superintendence of Mr Robert Fulton. . . . It was prepared by the naval constructor who built the steam ship plying between New York and New Orleans and is believed to possess all her properties of fleetness and ability to keep the sea. Hence it will be perceived that whatever remarks J. Stevens may have made . . . will not apply to the steam vessels preparing by the Commissioners. . . . The Board have reason to think they have had it in their power to avail themselves of every improvement that J. Stevens would introduce. . . .
>
> The Board think it would be impracticable to place engines on board vessels not prepared for them, at so short a period as he mentions; nor could they, when scattered along the coast, be readily assembled. . . . With regard to their speed, it must greatly depend upon their form and the power of the

engines . . . which . . . might be increased beyond that stated by John Stevens. If the speed cannot be [more than] 7 miles per hour, the Board believe that . . . one steam battery would destroy the whole fleet equipped by Jno. Stevens, as far as his communication made it known.

In conclusion, the Board takes the liberty to state that R. L. Stevens, on his visit some weeks since, became first informed of his father's schemes . . . and expressed his mortification and regret; assuring the Board that he had no concern in a project so wild. . . . The Board conceive it unnecessary to proceed into a further investigation.

Reading that report, the colonel went white with rage. He bundled up all his pertinent letters and papers, or copies of them, and sent them to the editor of "Niles Register" with a request for publication, together with "some strictures on the report of the Board which I shall send on in a few days." The editor, perhaps terrified by the bulk, did not publish, but the strictures were drawn up in due course.

From the nature and tendency of the plan suggested, it was eminently calculated to excite a hostile spirit among naval Commanders. If, as expressly stated, it would have a tendency to annihilate the present system of warfare, would it be expected that these gentlemen should feel kindly toward it? . . . I shall now proceed to answer . . . as may be necessary. . . .

The Board states that the model . . . adopted was prepared by the Naval Constructor who built the steam vessel [*Robert Fulton*, not *Demologos*] plying between New York and New Orleans. This ship, then, is to be considered an exemplification of fleetness and ability to keep the sea. . . . It is a notorious fact that, during her last voyage, she was unable to work her engines for some days and that, in this situation, she by no means proved to be a good and safe sea-vessel. . . . With respect to speed, great reductions are to be made on account of her wallowing. . . .

But, at once to put down vain boastings . . . (J. Stevens

not being a betting man himself) a friend of his is ready to bet the gallant Commodore Rodgers as follows:

1. That the *Philadelphia* (constructed & owned by J. Stevens and his sons Robert and James) shall beat the steamship *Robert Fulton*—on whose model the contemplated steam batteries are to be constructed—at the rate of 3 miles an hour.
2. That the *Philadelphia* shall beat the *Fulton*, 2 miles an hour.
3. That the *former Philadelphia* shall beat the *Fulton* at the rate of 1½ miles an hour.
4. That the *Philadelphia* shall beat the *Fulton* at the rate of one mile an hour.
5. That the utmost speed of the *Fulton* does not exceed 7 miles per hour.
6. That the *Philadelphia* is at present the fastest steamboat on the waters of the U. S.

The amount offered to be betted shall be from one to five hundred dollars on each bet. The money to be deposited in the U. S. Bank. Each party to chuse an umpire, who are to superintend the measurement of given distances; for the *Fulton*, along the shore of the North River, and for the *Philadelphia* along the shore of the Delaware. They are also to be on board of each vessel when the trial is made.

The Commodore is precluded from advancing a plea that *he* is not a betting man, in excuse for declining; he having, on some former occasion, challenged my son Robert in a bet of $1,000 that, with oars in a barge, he would beat the *Philadelphia* 600 yards in four miles. Should the bet, therefore, not be accepted, it will be sufficiently obvious that the above is an idle boast [by the Board].

The *Robert Fulton*, against which the colonel proposed to place these bets, had made her first coastwise trip in 1820. A hundred and fifty-eight feet long, with ten-foot draft, and twenty-four foot paddle-wheels, she had been built by Henry

Eckford. As Jaspar Lynch supervised the construction, it was presumably to him, as naval constructor, that the board's references were made. This ship, according to Morrison, had a schedule of approximately four days, New York to Charleston; four days, Charleston to Havana; and three days, Havana to New Orleans. A very fair speed for 1820. This, of course, was without guns, which fact led the colonel to say that steam batteries upon her lines and design would "scarcely exceed one-half that which I shall be able to give steam-vessels fitted on my plan."

The Board [he added] acknowledges that . . . my son exhibited a model, which I have reason to think was the only one offered. This model, with alterations for the worst, was in fact adopted. It was upon the plan of a single vessel instead of two, as in the steam battery at New York. So far, then, the Board have actually availed themselves of *one* improvement that J. Stevens would introduce.

It is truly sickening to hear these sea-captains, whose utmost attainments in science extend no further than, by means of tables, to keep a reckoning at sea, . . . proceeding with all due gravity, pomp, and solemnity, to inform the Committee that . . . although "none of the plans could be wholly approved of . . . persons known to be of the first abilities in Naval Architecture were employed to make a model." . . .

Who are to sit in judgment . . .? Surely not sea-captains and shipbuilders. Unquestionably, "vain projects and visionary schemes" can be avoided only by the employment of an engineer previously known to be skilled in this department of science. The Board have admitted R. L. Stevens to be "a man of great mechanical talent." . . .

With unparalleled audacity and mendacity it is stated that J. S. brought forward a "suggestion to suspend further expenditures on other objects of national defense." . . . By a recurrence to . . . documents, it will be found that I suggested merely suspension . . . on Steam Batteries. . . . It was, no doubt, expected that, by thus throwing ridicule on

the plan I suggested . . . so manifest an evidence would be afforded of the "infirmity and imbecility of my mind" as to impress a character on [my] plan . . . wholly unworthy of attention. In this expectation, I trust . . . the Board will eventually find themselves woefully disappointed, and John Rodgers will yet rue the day in which he was induced to place his signature to an instrument containing insinuations so indecorous and cruel, and misstatements so foul and disgraceful.

This was the colonel at his hottest. When he had cooled down a little he declared that "if vessels can be made to navigate by steam alone, in all weathers, no ship of war on present construction would be able to contend with them. It follows that such ships would become totally useless, and what then, of the present Naval establishment? When I assign a dread of these consequences as the only possible motive for the conduct of the Naval Commissioners in reference to the plan I have suggested, I would not be understood as impeaching such conduct. They have only acted as the majority of mankind would have done. The magnanimity and disinterested patriotism of a Washington are not to be met with, every day." In his own enthusiasm for steam he could hardly make a fair allowance for the feelings of sailormen of the Rodgers school, taught to smell the breeze while it was still beyond the horizon or to crack on through a rising gale until their tops'ls split. Steam clouds merely stung their eyes and blinded them to the inevitable. For them to consent to building even one steam battery meant a wound in their pride which would not heal in Bob Evans's day; not for a throne in Valhalla would they have admitted that "sailor" and "engineer" could ever become practically synonymous terms.

CHAPTER EIGHTEEN

The colonel's earliest conceptions of an armored vessel called for a saucer-shaped hull, plated with iron, which he proposed to moor in the harbor on a swivel. With several propellers, he would be able rapidly to spin her and thus keep her guns always bearing. "A turtle," he called her, "whose hard shell no enemy could crack." The design was the one John Elder of Glasgow actually completed a good many years later; in the colonel's time, it met with no favor. Nevertheless, as they proceeded with their gunnery experiments both he and Robert became more and more convinced that the other navies of the world would soon snatch the lead in guns away from our navy, and that heavier protection would be the only thing to save the American battle fleet of the future. Against their newest target, of stouter oak and faced with iron, Edwin—although he fired a bronze cannon at short range until it was red-hot—could make little impression. If the target was inclined, the shell glanced off harmlessly—a point that stuck fast in the minds of Robert and Edwin. Their father, although he shortly became much absorbed in railroads, did not wholly abate his appeals for a new navy. After making no headway in 1821, he continued to try for it sporadically during the next ten years. Writing on March 22, 1830, to Senator Mahlon Dickerson, he gave "a solemn warning that, should we continue to remain unprepared in the event of another maritime war, woe! betide us. Our first-rate line of battleships must be demolished."

He had had, he added, the "consummate assurance" to propose to the President that an office which might be called "Superintendent of Steam Boat Naval Tactics and of Railways for Post Roads" be established, and that his son Robert be appointed the first incumbent. Dickerson thereupon described Congress as "having but very little disposition to create new offices," but thought "no other man in the United States so well calculated as Robert" to fill such a post. To Edward Livingston, then secretary of the navy, the colonel made the same suggestion in a long letter dealing with the failure of what he called "this heterogeneous motley crew of sailors" to adopt steam. Quoting what the auditor had just reported on the chaotic state of naval expenditure accounts, he urged that the secretary "make a new start" in order to restore regularity. Were Robert chosen for the suggested post, the colonel hoped he might be first appointed and then invited to accept. If first invited, he would probably decline; if already appointed, he would not, by refusing, "reflect upon the President, his own mother, his brothers and sisters, and his father himself." Moreover, added the colonel, "when I aver that it is not from paternal affection I recommend him, I must confess that we are not now upon good terms" —which was quite true, since the valiant efforts of Robert and Edwin to keep the family property intact and upon a paying basis were not always approved by their father. One other quotation from his letters to Livingston seems of present interest:

> In a speech made by Mr Hayne, some two or three years ago, he very emphatically tells us that "the true defense of the country is pointed out by the finger of God." He then goes on to say that it is only in a Navy that we can place any confidence; but confesses that, with every exertion, we cannot reasonably hope to increase our naval establishment to any-

thing like equality with several European powers. . . . But what is the present state of our Navy?

The policy recommended by the President of "ceasing to build" is no doubt sound; but how are we to meet any crisis requiring a recurrence to war? Or how are we to defend ourselves against wanton attacks? . . . Should steam prove more efficacious than wind, as no doubt it will—and an enemy resort to the use of it, we [with steam] would always have it in our power to furnish our vessels with fuel. . . . Happily, we are severed by an ocean of 3,000 miles from our nearest neighbor. . . . Only by armed ships can we be annoyed.

Since the colonel thus fostered the seed of his interest in mobile, protected men-o'-war, it is not astonishing that it should grow steadily in the minds of his sons. To speak here of its ultimate blossoming is to run well ahead of the story, but to be, perhaps, more coherent. The late Admiral George Melville declared that it was Robert Stevens who "finally hammered the word 'battery' into the heads of government officials," but in this John Cox—and more especially Edwin—had a considerable part. The first ironclad in history was always known as the Stevens Battery.

Public interest in military preparation was again temporarily aroused in 1841 by the prospect of serious trouble with Britain over certain Canadian questions. Edwin, at Bordentown, conducted a new series of experiments, firing guns of various calibers against targets plated with iron of different thicknesses. His conclusions—of which he made no secret—were that the sixty-four-pound shot then in common use could be stopped by iron about four and a half inches thick, and, since no such plates were then manufactured, he proposed to build them up in laminæ. Some ten years later du Puy de Lome, constructor of Napoleon III's ironclad fleet, adopted about this average, while British engineers were working along the same line to the same

decision. Immediately after Edwin's experiments, he and John Cox proposed that they be permitted to build an armored vessel. Writing to the Navy Department, they admitted that the design would largely be due to Robert; as he was in Europe for his health, they would like, however, to proceed at once with preliminary plans. Soon afterward the President appointed a board to determine whether Congress ought to be asked to make an appropriation for the proposed design. Naval members were Commodores Stewart, Perry, and Smith, while Colonels Totten, Talcott, and Thayer represented the army at the first meeting at Sandy Hook in the early fall of 1841. After some three months had been spent in test-firing, the board unanimously reported that the Stevens plates would stand up against anything then known. A bill was accordingly drawn up and on April 14, 1842, Congress authorized the secretary of the navy to make a contract, under an appropriation of two hundred and fifty thousand dollars (Statutes of the United States at Large, Ch. XIII. An Act authorizing the Construction of a Steamer for Harbor Defense). Robert represented the Stevens family.

In the preceding August, at the request of the joint board, the brothers had drawn up a letter expressing their views on proper naval strategy and outlining the plan by which they hoped to give our navy a strong international position. They put into a few words what has been the object of all naval constructors, ordnance experts, and engineers since the Civil War:

> It appears to us that steam vessels of war should possess the following qualifications:
>
> Motive power . . . out of reach of an enemy's shot; the vessel herself proof against either shot or shell; the capability, when required, of great speed, combined with the power of

choosing, under all circumstances, her position with facility and certainty.

We believe these can be combined in one vessel

First, by having the engine and boiler placed below the water line and by using as propeller the Stevens Circular Scull, whose action is entirely below the surface.

Secondly, by constructing the vessel, above the water-line, of such material as should be proof against shot and shell and placed at such angle as should best resist or turn the one or the other.

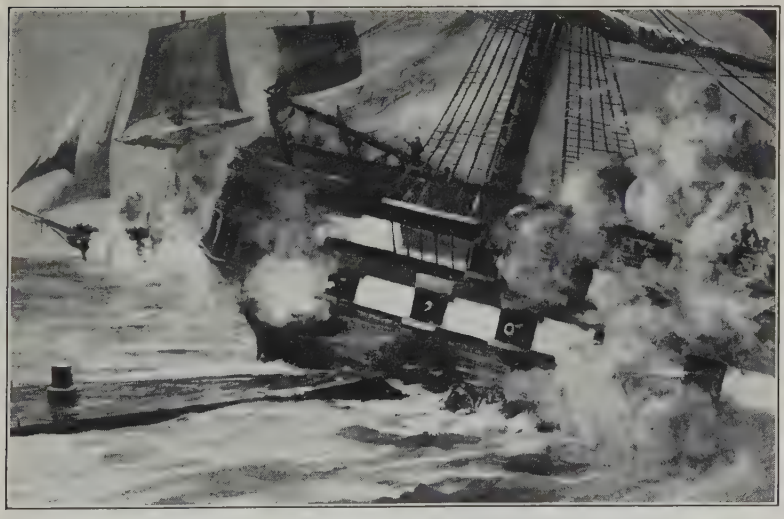
Thirdly, by working the engines expansively at ordinary times, with boilers capable of resisting a high pressure and generating, by the use of a more concentrated and inflammable fuel, a very large quantity of steam, giving greater power and speed when required.

In the construction of the vessel, we propose to substitute iron for wood; iron being of less weight than wood for equal strength and capable of opposing an equal resistance.

The thickness necessary to resist balls of the largest size would require to be determined. . . . We suppose a thickness of one-half to two-thirds the diameter of the ball, and set at an angle of 45 deg., would be sufficient. . . . It would require only 4½ inches . . . to resist a nine inch shell. . . . From experiment . . . it appears that it takes wood sixteen times the thickness of iron to offer the same resistance. Four inches of iron would therefore equal five feet four of oak. . . . Whether this ratio would hold good, when balls of the largest size are used, experiments easily made will prove. We believe it will.

If a submerged application [of motive power] can be used at sea . . . with no greater loss of power . . . than in rivers, there can be but little question of the propriety of adopting the submerged propeller. A steamship [thus] completely protected would have an advantage. . . . Experiment . . . to test fairly the value of a propeller at sea would, we think, fully repay the cost. . . . We would propose to rig the vessel to . . . depend upon her sails for ordinary cruising, with the exception of a small power to overcome friction of the pro-

THE STEVENS BATTERY ON THE WAYS



WHAT WAS EXPECTED OF THE BATTERY

pellers if it should prove difficult or inadvisable to unship them. . . .

We would arm her with a few guns of the largest calibre . . . that . . . present forges . . . are able to execute, as having greater strength in proportion to their weight . . . and throwing shot to a greater distance than any now in use. . . . We would load them at the breech, which would enable us to rifle the guns. . . . By casting a thin covering of lead or pewter around the shot or shell, and making it a perfect sphere or cylinder, it would enable us to make the diameter of the base the full calibre of the gun, doing away with windage and increasing the range and accuracy. . . . This covering could be quickly and cheaply put on [to] protect the shell from alteration of form and enable us to use and keep in order a more perfect gun. . . . The remainder of the armament should be shot-guns of large calibre, to throw a great weight of metal . . . at short distances. . . .

That no two steam vessels of war, at the present day, could come together at a speed of, say, six or seven miles an hour, without sinking one or both, is . . . certain. What, then, must be the effect of coming into contact with a vessel (safe from the shock herself) at double that speed? Instant and immediate destruction. The only question seems to be, could a vessel be constructed with the requisite strength and speed? We are sanguine that it can. . . . One would protect a harbor and be more than a match for a fleet . . . of the usual construction.

Beyond repeating that this letter was written in 1841, comment upon it is superfluous.

The late Dr. Henry Morton was particularly struck with the circumstance that led Edwin Stevens later to recommend adding an underwater ram, that weapon which had been known throughout all history but was not, until later, universally tried by the navies of the world. "One of the North River steamboats," said Dr. Morton, "ran into a crib dock built of 12-inch timbers and filled with stone. The

bow of the boat penetrated for 15 feet, shearing through timbers and displacing the stone, but the boat backed out, uninjured." "If," argued Mr. Stevens, "a lightly built river-steamer could do this, what would an equally rapid steamer, with iron hull and prow made like the blade of an immense axe, accomplish against the side of an ordinary wooden or iron vessel?" So the ram idea was added to the design.

A few months after John and Edwin had sent in their letter, Robert got back from Europe in time for the last target experiments. Immediately, as his brothers had counted upon his doing, he took the lead in the new enterprise. His letter to Washington, January 25, 1842, summarized the earlier conclusions and made some further points.

. . . The vessel is to be constructed upon a plan entirely new, invented by the writer. She is to be shot and shell proof . . . with greater speed than any vessel of war now afloat; her burden not less than 1,500 tons. [This] is not a theoretical assumption. Trials [against iron plating] were made with shells of a peculiar construction, prepared by the writer. Out of twenty fired . . . nineteen exploded in the manner anticipated. . . . No doubt whatever remains that a series of wrought-iron plates, riveted together . . . upon each other . . . to four and a half inches, will resist . . . a 64-pound shot. . . . At thirty yards, shells scarcely indented the iron; both shot and shell were . . . broken into fragments.

The part of such a vessel through which the guns are fired, might have port-holes little larger than the gun. These may be readily protected from canister, grape, or other shot by means of movable screens. . . .

The plan of constructing and arming a vessel, in most of its details, has been matured for many years. Delay in bringing it forward resulted from a conviction that a period more favourable would arrive, and it is believed that *it has now actually arrived.* The advantage of being the first to construct [such] a vessel would be very great [and] must secure us for

a long time against the vessels . . . of other nations. . . . As a means of defense, it would be cheaper than any other. . . .

Her ventilation would be artificial and constantly and thoroughly applied. Her crew would not exceed . . . one hundred and fifty. She would need no rigging. With anthracite as fuel, she would not be rendered visible either by smoke or by sparks and would, therefore, attract the notice of the enemy less, either by night or day. . . .

The knowledge of the existence of such a vessel would suffice to deter most commanders from risking an attack with a vessel of wood.

By what they had actually seen, the joint board was convinced. Other military men and civilians looked upon a ship wearing plates as a monstrosity. Naval officers were less prepared for such a radical departure than the men of the White Squadron of the nineties could be prepared for an electrically driven *Colorado*. Just as the school of Rodgers, long before, had hated the steam that was making of their noble profession a mere trade, so the sailors of the forties still loved the old plan of ship-action. They were out to snatch the weather-gauge of an enemy, and to begin to fight him only when their own mainmast had gone by the board or when his broadside muzzles lay just outside their own gunports. The clipper might gradually have to furl sail and disappear from blue water, but for these old shellbacks to be asked to fight from behind iron walls was nothing short of an insult.

The "Stevens boys" had shared too many of their father's experiences to be afraid of going against popular prejudice. With the battery, they paved the way for later improvements; by talking and writing on ironclads, they inoculated the naval mind and stamped the word "armor" in red ink upon the constructor's hand-book. By their persistence, they cracked the ice of official unbelief and made

it possible for the ingenious Ericsson, many years later, to push the *Monitor* through the cracks.

The congressional act of 1843, providing for construction, left years of struggle ahead of the Battery, with a result very different from what had been planned. Robert's original contract, made February 10, 1832, with Secretary Upshur of the navy, called for a vessel "not less than 250 feet in length, 40 feet beam, 28 feet in depth amidships; shot and shell proof against the artillery in common use, and protected by 4½ inch armor." Her four iron boilers were to have 50 per cent. more heating surface than those of the *Mississippi*—then regarded as a good type of steamer—while her four condensing engines were to exceed those of the same ship in the same ratio. With her single propeller she was to develop 900 horsepower. In what the ship eventually became, it is difficult to find a trace of these original specifications.

Since there were no building-ways adequate to such a craft, Robert's first step was to dig a dry-dock at the foot of the Hoboken lawn. Materials were collecting and pattern-making was well under way, when the whole work was suddenly brought to a dead stop by the refusal of Secretary Henshaw, Upshur's successor, to authorize any payments on account. It cost Robert a year of effort to get a second very full and minute contract which would permit him to proceed, and a third contract to provide for payments. He was hardly again under way before still another secretary —Bancroft this time—ordered another halt until the department should be furnished with a detailed plan. As Robert had submitted his general plan in 1843 and the details in 1844, he was furious. His work stopped, his health broke down, and he was again ordered to Europe, only to return when he heard that J. Y. Mason had become secretary and

was willing to arrange for an extension of the time of completion.

All these interruptions, with the changes suggested by the department and sometimes by Robert himself, lasted until the fall of 1848, when it appeared that some progress might again be made. Leaving Edwin behind as managing director, Robert again crossed the Atlantic to buy materials. His ship was hardly hull-down before still another secretary, Preston, refused to make the payments which had been agreed to by Mason. Robert, with British contracts for material already made, came home discouraged. Learning that the department now held all the various contracts void and proposed to sell the Battery as she then stood, he submitted the whole matter to Congress. He summarized all the various interruptions and delays, and added:

> It is manifest that, without some legislative action, the contractor, proceeding to execute his contract *made in good faith by the direction and under the authority of Congress*, is, by the strong arm of the Executive and, as he conceives, against right, to be subjected to the heaviest and most serious losses. He submits his case to an enlightened Congress and prays that such action may be had as to release the funds appropriated, from the erroneously alleged transfer to the surplus fund, and leave them subject to the refunding of his large outlay of money and to the full and complete execution of his contract. . . .
>
> In explanation of any seeming delay in the performance of this contract, it should be borne in mind that experiments were necessary to test the quality of materials and to improve the character of the propeller, from which the government derived this advantage: The frigate *Princeton* has availed of the propeller thus proved to be the superior of any other then in use, and with it made her voyages so successfully afterwards. Also, that workshops and, indeed, a small steamboat were required to be built for these experiments; and, in addi-

tion, a large dry dock was required to be constructed—with a steam engine, punching and drilling machines, and large pumps which have kept the dock free from water. All this consumed considerable time and personal exertion, for which no remuneration has been made—and occasioned delay and many, very many thousands of dollars of expenditure of which no part has, up to this day, been repaid. These delays have been satisfactorily accounted for to the Secretary of the Navy before the contract was renewed. When the contractor was arrested in his work by Secretary Bancroft, he was liable for materials, principally heavy plates of iron from Pennsylvania, to about $40,000 which was subsequently paid him. He is now in advance about $36,000 also for heavy iron plates, tubes for the boilers, etc, from England—and yet the Government is about to sell his property to recover what they have previously paid.

A volume of correspondence grew out of this situation, in consequence of which it was not until 1854 that the ship's floor timbers were actually laid. For the next year and a half, the work went forward briskly until it was checked, in 1856, by the worst possible blow—the death of Robert Stevens.

Edwin Stevens immediately assumed the whole burden. He quite understood the reluctance of the Navy Department to believe that ironclads would ever come into universal use; it was a reluctance still shared by the majority. Also, apart from the arbitrary halts called by various secretaries, he fully appreciated that naval developments during the past decade had been a logical cause for delays to experiment and consequent modifications of design. In his letter to Washington, written at the end of 1856 to announce Robert's death, he discussed the situation.

. . . Vast changes have taken place, both in the size of vessels of war and the weight of their armament, since the

year 1842. Paixhan guns of 64 pounds were the heaviest metal then used in the navy; now, solid shot of 172 pounds are not infrequent. The size of the vessels themselves has correspondingly increased.

While, therefore, the size and strength of the Battery were amply sufficient to resist the character of the vessels and arms then in use, they might prove an insufficient defense against the larger vessels and heavier guns which are rapidly being introduced into the navies of all the great Powers. These changes manifestly rendered necessary coresponding alterations in . . . the Battery without, however, in any respect changing the principles of the construction.

It would have been a far cheaper and more satisfactory procedure to have finished the Battery on her original design and then studied her performance as a basis for improved construction. Most of the many years lost in experimenting might thus have been devoted to building a whole fleet of ironclads. Who can deny that such a fleet, even if it had not entirely prevented the Civil War by a threat of effective blockade, might materially have shortened it? To have been the indirect means of saving countless lives and vast treasure, and thus softening the bitter aftermath, would have placed the Battery beside Colonel Stevens' railroads as a contribution to the preservation of the Union.

As matters actually stood in 1856, Edwin invited attention to the design of the ship as modified from the original. He quoted a summary previously prepared by Robert:

	Contract, 1843	*1856*
Length	250 feet	415 feet
Beam	40 feet	48 feet
Depth amidships	28 feet	32 feet, 4 ins.
Protection against gunfire	4½ in.	6¾ ins.

	Contract, 1843	*1856*
Boilers	4	10
Engines, condensing	4 or more	8
Horse-power	900	8,624
Propellers	1	2
Shafts	1	2
Auxiliary engines	2	9

It should be understood that some of these changes had been Robert's own suggestions; the point is that, but for various governmental delays, he could have pushed the work to completion in far less time than fourteen years. Up to the time when Edwin wrote, a total of $387,000 had been spent from the appropriation of half a million. In addition, Robert had spent, of his own money, $113,579.11, while Edwin, anxious to go on, had added another $60,000. In reporting these sums, Edwin added:

> . . . These sums include no charge whatever for the rent, taxes, or expenses of the contractor on keeping up land which has for some thirteen years, been thus used by the government.

Anxious to get a satisfactory answer to the question "What shall now be done with the vessel?", Edwin gave his reasons for wanting to complete her.

> My confidence in her success, and my deep regard for my brother's fame, make me most anxious that she should be completed. . . . Believing the invention which gives value to the vessel to have been exclusively my brother's and [hence] American; finding that, in the recent conflicts in Europe, . . . these governments have not hesitated to adopt, from the vessel and the experiments which led to her construction, the same principles as the only sure and best method of resisting the heavy batteries of the present day . . .; I earnestly hope it will not be abandoned. . . . I am ready to give freely, in any way, my aid, time, experience, and skill to the work.

Notwithstanding the progress in the British and French navies, the Government of the United States was still insufficiently convinced on ironclads to accept Edwin's offer. Not until 1861 was public interest again aroused, and even then this was largely incited by such papers as the "Scientific American" and "The New York World." Rumors went about to the effect that the ship so long hidden behind the high board fence at Hoboken would be 700 feet long and of seventy-foot beam—leviathan indeed. In February, the "World" was allowed to send a reporter through the stockade and score a "scoop" with a description. Editorially, the "World" said on July 26:

> Some months ago. we published the first authentic account of the Stevens floating battery, lying uncompleted at Hoboken, urging its completion and use by the government. The events of the last two months have added emphasis to what we then said. Had it been afloat and in trim, with a fit armament of rifled cannon, SUMTER might have been provisioned or reinforced at will, without asking leave of Governor Pickens. Could it sail out of this harbor today, its doing at Charleston, at Pensacola, or even at New Orleans, might give the rebels something else to attend to than strengthening their defenses at Bull Run and Manassas against another assault.
>
> Let pass the fact that our great harbors are absolutely defenseless against the mail-clad steamers of other nations. Is it not plain how effective an addition to our working-force, in the suppression of this rebellion, this iron-plated battery or another "Warrior" or "La Gloire" would be? Let the Board of Examiners appointed by Congress be speedy in coming to a conclusion and, if the Stevens affair is not the right sort, let them hasten to tell us what is; and Congress will not be laggard in ordering it.

The board referred to included line officers of the army and navy with two civilians, Professor Henry and Mr. S.

Y. Merrick. At the request of the officers, who naturally had insufficient experience in engineering to criticize an engineer's ship, Naval Constructor Pook was later added to the board. The report—well worth reading to-day—stated that, "with certain modifications," the ship could be made into "an efficient steam-battery." The parts of the ship designed to be shell-proof were considered invulnerable, but Constructor Pook thought the armor should be carried farther down. Colonel Delafield, overlooking Edwin's obvious objection to destroying her stream lines and slowing her down, wanted to cut fifty feet off each end of her. One member held that the guns were not heavy enough; another insisted that her present guns would "demolish her decks." Edwin built a facsimile deck and fired the guns over it without any resulting damage; but, unfortunately, only two of the board had accepted his invitation to witness this test, thus failing to appreciate how favorably her broadside, weighing 2200 pounds, would compare with the *Warrior's* at 1564 and *La Gloire's* at 1130. To the objection that the ship herself would not stand a seaway, Edwin replied by submitting certificates of her strength from Harlan & Hollingsworth and Neafie, Levy & Company, the two leading builders of iron ships, whose opinion was shared by other prominent engineers and builders. To Edwin's gratification, the board appreciated the ship's designed maneuvering qualities—due to eight engines capable of being operated by only two men and yet built to give her a speed estimated by the board at "between seventeen and twenty" miles per hour. One member, however, somewhat naïvely remarked that her "great length would be fatal, *if it were not for two propellers!*" Others thought the auxiliary machinery too complicated, suggesting that the hydraulic method of elevating and depressing the guns would be liable

to break down—a good point, in view of the navy's later difficulties with this type.

Edwin agreed to the whole long list of suggested modifications. To demonstrate that she was strong enough to carry her designed armor, he cut a section out of her side and loaded it with double the designed weight. Gauge tests showed no signs of yielding. To the objection that shooting away the shell-proof deck forward of and abaft the casemate would mean sinking her, he replied by explaining the arrangements for maintaining buoyancy. The reserve counterbalanced flooding of the shell-proof deck, with a settling of no more than fourteen and a half inches. Some of the board's objections were not stated to Edwin while he was before them—a circumstance against which he protested as giving him no opportunity to correct misconceptions and make pertinent demonstrations.

It was a hard blow to him when the board, with Professor Henry as dissenting minority, reported that it would "be inexpedient to finish the vessel along the line proposed." In a long memorial to Congress he urged that the Government, having invested half a million, ought not to lose it—particularly since the ship could be finished in a few months. When the board's report nevertheless prevailed, he wrote to Senator John Hale and Congressman Charles Sedgwick, chairmen respectively of the Senate and the House Naval Committees.

July 10, 1862.

Gentlemen:

With a view to making my propositions more clear and definite, and to prevent any misunderstanding, I now present them to the Committee and will carry into effect, on my part, any one of them that may be adopted by Congress during the present session.

First, that the Government pay me the money advanced by my brother and myself for the Stevens Battery, and finish the vessel on such plans as they think best; relieving me of all responsibility.

Second, I am willing to modify the first proposition as follows: To commence auditing the accounts *de novo*, charging everything that properly belongs to the Battery and crediting all received on account of same, without reference to the contracts.

Third, that the Government release to me their claim to the vessel, and I will finish at my own risk and expense, as a war vessel, within eighteen months; with the right, in that event, that the government—if, in their opinion, it is a success—take the vessel at the amount estimated for its completion, namely $783,294—or I will forfeit 100,000 as the liquidated charge.

Fourth, that the vessel be sold for the benefit of the parties concerned and the proceeds of the sale paid according to the decision of any Federal court having jurisdiction, with the right of either party to appeal to the Supreme Court.

Fearing that the expression in the above—"the money advanced by my brother and myself"—may be misunderstood, I will state that it was intended to apply only to the accounts not yet audited and not to those already audited, settled, and paid . . . amounting to $500,000.

Months earlier the Confederacy had gone ahead of the Union by producing the *Merrimac*, which was also called by her converters, the "Battery." It is by that much fortunate that the Stevens brothers remained loyal and refused to "sell the idea south"; had they done so, there might well have been no Union fleet left afloat by midsummer. As it was, Edwin, without waiting for government action on the larger craft, had built a smaller ironclad which he christened *Naugatuck*, although she sometimes appears in the official records as "the Stevens" or as "the Battery." The "World" of March 10 had printed an account of her:

Carpenters and machinists are busily at work upon this vessel, which is understood to be under sailing orders. Her rifled gun is of 100 pounds calibre. She is not intended to be a model of Mr Stevens' iron battery but is designed to illustrate some novel ideas connected with that engine of war, viz: The ability to sink and rise with great rapidity; to turn and manage the vessel by means of two propellers, situated on either side of the stern; and to take up the recoil of the guns by india-rubber springs. The gun is mounted amidships, pointed toward the bow, and is loaded by depressing the muzzle. The hull of the boat is of iron, 101 feet in length, 20 feet beam, and about 7 feet deep. She draws about 5½ feet light and nine feet loaded. Her speed is eleven miles an hour.

She is not ironclad with the exception of the bow but, in action, when submerged, has two feet of water between the two decks and presents but a small surface upon which the enemy can bring their guns to bear.

The *Naugatuck* will be supplied with two of James' 12-pound howitzers, and will have a crew of about twenty-four men: A boatswain, gunner, carpenter; two quartermasters, fourteen seamen, steward, cook, and servant. Mr W. W. Shippen, agent for the Hoboken Land and Improvement Company, will go in temporary command. The officers are as follows: Lieutenant J. Wall Wilson, of the United States service, first officer; E. L. Morton, second officer; Thomas Ligle, engineer. The officers quarters are on deck. When in action, but one man is necessarily exposed on deck.

In connection with the *Naugatuck*—and the Battery—Edwin took out at least two patents. One covered the use of gum-elastic as internal sheathing for compartments to be filled with water when submerging; the other was for his design of inclined armor, used in connection with air-compartments for buoyancy, and also for "shot-proof loading-house, so arranged as to be employed substantially as described, that cannon outside of them may be loaded from within"—the breech-loading plan which he and John Cox

had previously advocated. The big gun was a Parrott model, to be kept bearing on the enemy by the twin-screws which made it possible to turn the ship about in less than a minute and a half. To pump her out, after submerging, required eight minutes.

Thus equipped, the *Naugatuck* saw considerable service, chiefly in and about Hampton Roads or on the James River, where her submerging quality was made use of by putting her at the head of the Union fleet in column. Tatnall of the Confederate navy evinced his respect for her in a comment upon a proposed York River expedition, written from his flagship *Virginia* to General Johnston.

April 30, 1862

. . . This would oblige me to pass the forts by daylight, after which I should have to contend with the squadron of men-o-war below the forts, which is large and includes the *Minnesota* and the iron clads *Monitor* and *Naugatuck*.

Because of her superior speed, Goldsborough frequently used her as a despatch vessel and occasionally to carry the wounded back to the base. An entry in the log of the *Octorora* runs "at 12, off Hampton Creek with the *Naugatuck*, the rebel fleet underway between Sewall's Point and Newport News," and at least once she exchanged shots with the *Merrimac* before the latter withdrew. Later, her big gun exploded, but this was without serious damage to her, for long after the war ended she was still in service as a revenue-cutter. That much, at least, Edwin Stevens was permitted to contribute to the Union cause.

Incidentally, the *Naugatuck* performed one entirely personal service. Edwin's daughter Mary had married M. Russell Garnett, a congressman from Essex county, Virginia. While the war was in progress, Edwin learned that Garnett,

then serving in the Confederate Congress, had died of typhoid and that his widow wished to come North. He secured the use of the *Naugatuck* and sent his brother-in-law, Captain Albert B. Dod, up the Rappahannock to get Mary. Garnett's mother, as a sister of the Confederate secretary of the treasury, was a rabid secessionist and refused to let Mary leave the house. At dawn, Mary, her two children, and a negro nurse escaped and reached the spot on the river bank where Captain Dod was waiting to take them off to the ship. On arriving at Hoboken, Mary's feeling for her husband made her protest against the flag flying over her father's house, but she surrendered at discretion when he said to her: "That flag stays where it is—whether you do or not!"

When Edwin learned of a possible opportunity to proceed with the Battery, he immediately wrote to Gideon Welles:

Hoboken, February 24, 1863

I see by the public press that the Government is about to construct several large sea-going iron-clad ships-of-war. These vessels, as I understand, are intended to be about the same length and size as the Stevens Battery; and one of them now under contract with Mr Webb of New York, it is said, will cost $4,000,000.

I propose to relieve the Government of all risk as to the success of at least one of these vessels by obligating myself to complete the Stevens Battery and deliver her for service on the following terms:

1st. That she shall be impenetrable to the most destructive missile fired from the most powerful gun (with its ordinary service charge) now used in our own or in any European naval service; to be tried upon her at short range—say 220 yards.

2nd. That she shall have greater speed than any other iron-clad war steamer in the world.

3rd. That she shall be more manageable and more quickly

turned and manoeuvered than any other large armed sea-going steamer.

4th. That she shall have an armament capable of throwing a broadside at least equal to that of any ship now afloat.

5th. That she shall be delivered to the Government, complete and ready for service, within nine months from the time the order is given, for the sum of $1,500,000; but no payment will be required until she shall be ready for delivery. Provided, however, that the performance by me of these conditions is not to rest upon theoretical opinions but (if desired) shall be brought to practical tests—the test of her seagoing qualities to be a voyage to Charleston Bar and back to New York Harbor.

The conditions attached to this offer, if fulfilled, would make the ship the most powerful and efficient war steamer in the world, at a cost to the Government far less than that of the *Warrior* or *La Gloire*, or any other ship of the same size and quality. She could also be completed in less than half the time it would require to build a new ship. If she should prove a failure, the whole loss falls upon me and not upon the Government.

Or, I will transfer the vessel to the Government as she now stands—having her hull, boilers, engines and machinery nearly all complete—for her cost to me (say $250,000); provided she is then finished on my general plan, I estimate she would then cost the Government in all $1,000,000. This arrangement would give the Government the benefit of the $500,000 heretofore expended on the ship and relinquished by the action of the last Congress. As will be seen from the last offer, I do not propose to make any profit out of the Government but desire the completion of the vessel for the national good. And, to protect the reputation of my brother and myself from the discredit of failure, I hope that she may be completed on our plans, that we may not be held responsible for the success of the plans of others.

These offers proved no more acceptable to Washington than the others had been; in consequence, the Battery never saw active service. After the war, Edwin pushed the work

BLOCKS USED BY ROBERT STEVENS, CAMDEN AND AMBOY RAILROAD

upon her at intervals, with some idea of selling her, through General McClellan as agent, to France or Russia. Not having done either, before his death in 1868, he left $1,000,000 to finish her with the understanding that she should be presented to the State of New Jersey or else sold for the benefit of his own estate. After New Jersey, by a special act of Congress, was authorized to accept her, B. G. Clark, Fitz-John Porter, and William Shippen were appointed commissioners, while completion was intrusted to McClellan, with Isaac Newton as assistant. It was proposed to apply to her all that had been learned about ironclads during the twenty-seven years since her first projection, such as a new type of engine, greater subdivision into watertight compartments, and similar changes which were to insure her preëminence. Before all this could be accomplished, Edwin's million was exhausted. A friendly suit in chancery was instituted to determine whether the Battery now belonged to the State or to Edwin's heirs, and in consequence of this she was eventually broken up and sold to dealers in second-hand materials.

The sons of Colonel Stevens were like him in believing the ancient truism: "Results are what count." For this reason they often pursued experiments in the face of every discouragement. In the same spirit, those of them who were still alive were able to swing their hats when the *Monitor* fought the *Merrimac* to a draw; as sportsmen, they could do that even while they chewed the bitter bullet of might-have-been. Theirs was, after all, the first ironclad; representing the theories of Colonel Stevens in 1812, the gunnery experiments of Edwin in 1814 and 1841, and the leadership in actual man-o'-war design as taken by Robert in 1842.

CHAPTER NINETEEN

In February, 1815, five days after he had secured the first railroad charter, Colonel Stevens learned that Fulton was dead. History, reporting the January weather as vile, says that Fulton caught a fatal cold. Since both men had been at Trenton for some time, the colonel cannot have missed the two cases which were engaging Fulton—one, with Nicholas Roosevelt over the latter's paddle-wheel patent of 1814; the other over Ogden's avowed right to prevent New York boats from landing in Jersey as long as Jersey boats were forbidden to land in New York. Most of the accounts of these trials, while brief and vague, show a distinct bias in favor of Fulton; at least two are just as bitter on the other side. John De Lacy, Fulton's former agent, wrote to Roosevelt—who appears not to have been in Trenton—that Fulton's "brazen-faced effrontery, as if he was entitled to violate the law as well as private rights," would avail him nothing, because he was "down never to rise again, particularly if the report of this Committee should be agreed to by the House." Dr. Thornton (correspondence, October 27, 1819) sent George Jay a dramatic description of the moment when Hopkinson, on Ogden's counsel, lifted to the light the paper which Fulton as witness had just introduced as an original sketch made by himself for Lord Stanhope. The American watermark, explained Thornton, proved that the paper had not been manufactured until three years after Fulton's visit to Stanhope. Despite Fulton's protest that he had meant to call the sketch a copy, the court, continued Thornton, was

filled with the cries of "Shame!" and "Perjury!" While the colonel would not have permitted himself to join in any such public demonstration of New Jersey's feelings, the steamboat interests he had at stake would certainly have brought him into court where he could hear the demonstration.

He had no love for Fulton and no cause to regret his passing. Among many references to Fulton's brilliance, the colonel's papers show no trace of sorrow over his loss. The simple fact is that by Fulton's death the greatest obstacle to the real spread of American steamboating was removed. For some years the heirs and associates of the monopoly succeeded in holding aloft the names of Fulton and Livingston—painting, indeed, a composite portrait of them as the sole genius of steam-engines, which has ever since hung upon the walls of tradition. At the time, however, it required the mathematical cleverness of the one and the political influence of the other to give the portrait real life. Steamboat monopoly was doomed in February, 1815, and capitalists who had hesitated to go to the legal mat with Fulton now entered the ring in earnest.

The season on the Delaware was a busy one. The *Phoenix* and the *Philadelphia* were both running, the latter, because of her greater speed, the natural favorite. With the other Stevens boys, the services of James were soon required in a managerial capacity, and it was from him that many of the colonel's letters of the period came. "Today's passage money," says a typical report in May, "is $178.37½, of which fifty dollars is for freight on several wagon-loads of Spanish Dollars." On another day it was serious matter that the captain should be obliged to go to Princeton "after a man who had given the Steward a counterfeit note." When James was not on board it would be Captain

Jenkins who reported: "Agreeable to your request, I have shipped by Capt. De Groot of the Schooner *Jersey* one Bbl. of Porter. The Schooner lays at Old Slip and the freight is not paid. I can buy Porter at $3 per doz. or 1 dol. and return the bottles." When a gale tore the *Phoenix* from her moorings and threw her on a reef, the *Philadelphia,* after a struggle, dragged her off again. And the ferryboat at Philadelphia, over which the colonel had had such long negotiation, was at last "planked over" and finished by Van Dusen the shipwright.

At Hoboken the colonel leased his ferry—on which horseboats were still operating—to the Swartouts. Working in connection with their relative, Philip Hone the diarist, these gentlemen did not make much of a success of the service, and the colonel, claiming breaches of the contract, made legal entry and demanded surrender. This was refused and a long correspondence followed. The colonel wished Hone to retain the lease but insisted upon changes in the management. "From the present high rate of ferriage, the tedious passage, and the disgusting accommodations," said he, "persons seeking pleasure will all be driven to Long Island or elsewhere to obtain their object on better and cheaper terms." He felt that New Yorkers visiting Hoboken merely on a holiday should be carried for half fare and be given a ticket good for "refreshment at the Hotel to the extent of one shilling." Similarly, "Boarders at said Hotel, by the week or longer," should be allowed to "commute their ferriage at the rate of one dollar a month." Such changes, he hoped, would not only popularize the ferry but also increase business at the old '76 House near the Hoboken landing. He had presented this inn to James, who had leased it to Lucas Van Buskerck under an arrangement providing that the latter should "see the ice-house filled in a proper manner"

on condition that James erected "a new nine-pin alley" and kept "Roof and Wheather Boards" in repair.

Between all those interested, an amicable and satisfactory plan for operating the ferry was not found until Robert and John Cox took over all the various leases and established themselves as a company. They then took a bold stand with those old competitors, the Paulus Hook men. "Provided we are left undisturbed, we are ready and willing that steamboats . . . shall be placed on your ferry. It is distinctly to be understood that we are fully determined to run steamboats." Not since the day of the *Juliana* had there been a Stevens steamboat on the Hudson, but the new company was convinced that nothing else could give adequate service and therefore proceeded immediately with designs and drawings.

Turning active management over to his sons left the colonel free to prepare for legal battles, several of which he was expecting. Congress had taken up the matter of extending Fulton's patents for the benefit of his widow and children—a business in which, it appears, Aaron Ogden had bought a half interest. Fearing that a new law might make no recognition of the waters ceded to himself, by the agreement of 1809, the colonel entered into a supplementary contract with Fulton's executors reaffirming his right to use the patents if they were extended. This left him in better case to guard against the infringements other Delaware craft might make upon the improvements that Robert was almost daily introducing on that river. According to Rachel's letters, it was the "fine accommodations" offered by Robert which kept his line running when the North River boats, in a time of depression and lack of travel, were "losing thousands."

It is in Rachel's letters that most of the family news of

this period is to be found. She wrote regularly to her son Richard, by this time gone for a sailor and serving on the *Guerriere* as assistant surgeon. "Your Papa," said she, "thanks you for the wine you sent from Gibraltar. It has been in New York for some time, on a vessel in the East River; we were unable to get it because of Yellow Fever raging. The people have been asked not to return to their houses until cold weather." Another item in her budget was Robert's request that Richard "tell everything that is going on in steam navigation in Europe." As to John Cox, she reported that he was dissatisfied with the farm he had bought in Annandale and was trying to sell it. She also spoke of the prevailing enthusiasm for canals, reawakened by Judge Pratt after its long sleep through the War of 1812. From the colonel, she had heard the prediction that the Erie would cost perhaps double what had been estimated, and consume years that might better be devoted to developing railroads. But Rachel never believed as fully in railroads as she did in steamboats.

Not so with the colonel. He contended that land and water transportation must progress together, now that the "difficulties, dangers and delays during the late war" could no longer block them. In this vein, he urged upon President Madison a broad plan for the Eastern States.

> From Providence in the state of Rhode Island to Savannah, Georgia, a distance of more than a thousand miles, is an inland navigation through rivers, bays, and sounds, with interruptions at only four different portages . . . amounting . . . to not much more than a hundred miles: . . .
>
> New Brunswick to Trenton . . . 25 miles . . .
>
> Across from the Delaware to the Chesapeake . . . at a point between Newcastle and Reedy Island . . . 12 miles. . . .
>
> From Norfolk to some of the waters leading into Albemarle

Sound . . . 12 to 20 miles. . . . After Swansborough . . . another portage to Wilmington, . . . about 40 or 50 miles. . . .

Thus . . . by means of steamboats and railroads . . . the whole of this journey might be performed . . . in half the time now taken to convey the mail. . . . It may be combined with an efficient system of defense . . . by constructing the steamboats [so] they may at any time be converted into ships of war.

Should Your Excellency be disposed to view this plan of which I have sketched an outline . . . I feel the fullest confidence . . . of being able to give satisfactory explanations.

As Madison was himself impressed by the possibilities of railroads, it is evident that there must have been strong opposition in Washington to his taking favorable action upon the colonel's letter. Considerably later, after he was no longer President, Madison commented upon further papers on the subject sent him by the colonel.

Montpelier, Nov. 17, 1818

. . . I am so much a friend to every improvement which can cheapen transportation, that I have always been disposed to think favorably of the railroad as better adapted to many situations . . . than the turnpike or canal. . . . I can only say that I am glad to see your skilful attention turned to this subject, and wish that a fair experiment might be made. . . .

I regret that I am obliged to give so unsatisfactory an answer to your letter. I hope you will believe me not the less sensible of your meritorious zeal in promoting objects of public utility, nor less sincere in my assurances of esteem and friendly respect.

This was more encouragement than the colonel had from most of his distinguished correspondents. To John C. Calhoun he had explained how the war had prevented action under his Jersey charter and how he now felt that govern-

ment interest should be capable of being aroused. But Calhoun helped him no more than did President Monroe, to whom he presented the whole railroad idea—with its specific application to connecting the Western States with the coast. As the secretaries of war and treasury had been instructed to report to Congress on internal improvements, the colonel hastened to suggest to Crawfurd of the Treasury that a short line of railroad from "some landing on the Potomac to a central part of the city of Washington" would bring the idea immediately before the representatives of the whole nation in a convincing way. Anything to get an experiment.

All these public men found one excuse or another. As might be expected, no excuse was better expressed than Jefferson's, in his letter to the colonel:

Monticello, Nov. 23, 1818

Sir, age, and its consequent infirmities of body and relaxations of mind, have obliged me to retire from all general correspondence. I am no longer equal to the labors of the writing table.

There is, moreover, a term when age should know itself, withdraw from observation, and leave to the next generation the management of its own concerns. With my best wishes in favor of every improvement which may better the condition of mankind; at my period of life, tranquility & rest from care are the *summum bonum.*

Trusting, therefore, to your kind consideration for my excuse, I return you the papers inclosed to me, unread and unopened, with the assurances of my high respect & esteem.

Since he was six years younger than Jefferson, the colonel was by no means ready to leave anything so interesting as railroads to the next generation; particularly unready because he had some evidence of the next generation's doubts. His son James thought "the chances very much against

TUESDAY, March 23, 1819.

Mr. Breck from the committee to whom was referred on the 11th inst. a petition from John Stevens, on the subject of rail ways, made report, which was read as follows, to wit.

That these rail way roads are scarcely yet known in America, but that in England they have long been, and now are, successfully used, particularly upon inclined planes, in the neighborhood of coal mines. They consist of a tract constructed of iron, stone, timber, or other material, upon a level surface or inclined plane, or other situation, for the purpose of diminishing friction, and thus serving for the easy conveyance of heavy loads of any kind of articles.

They have been multiplied in various parts of Great Britain, in short sections of one and two to five miles, and serve greatly to cheapen the transportation of lime, coal and other bulky articles from the quarries, kilns and mines, to the canals, which intersect that country in almost every direction, and have been very useful both in regard to its agricultural improvements and its manufacturing interests.

Some of these roads are formed by means of iron rails laid along them, upon which the materials are carried in waggons of from six to thirty hundred weight, and on a rail way well constructed, and laid with a declevity of 55 feet in a mile, one horse will readily take down waggons containing from 12 to 15 tons, and bring back the same waggons with 4 tons in them.

It is even stated by English writers that a horse of the value of 20 pounds, or about 90 dollars, drew down the declevity of an iron road 5-16 of an inch at a yard, 21 waggons with coal and timber, weighing 35 tons; the same horse drew up the declevity 5 tons with ease.

Mr. Stevens has calculated the cost of a mile of rail way in America as follows:—

Bar iron plates,	7,603
Brick pillars,	1,600
Timber ways,	1,500
Reduction of elevations,	500
	$ 11,203

That gentleman has gone into minute explanations of his views, upon this novel and interesting subject, as may be seen by the accompanying diagram and papers; and by a reference to them it will be seen likewise that in 3 or 4 instances rail-way roads

have been profitably extended to a distance of 28 miles; and may be adopted in this country for the transportation of bulky articles from river to river, over ground that has not more than one degree of elevation, or 90 feet in a mile.

Prone as the people of America are to introduce into their country all useful improvements, we must soon expect to see experiments made here upon these rail ways. It would perhaps have been desirable to have had even now a trial made upon a small scale, under the immediate authority of the government of Pennsylvania; but the lateness of the session forbids any such expectation, and the committee therefore beg leave to recommend the memorial of Mr. Stevens, together with the subject generally, to the early attention of the next legislature.

Ordered, To lie on the table.

The bill from the House of Representatives, entitled

"An act repealing the acts, entitled, an act declaring Anderson's creek in Clearfield county, and part of Le Bœuf creek in the county of Erie, public highways," was read the third time, and

Resolved, That it pass.

The bill from the House of Representatives, entitled

"An act providing for the vacation of parts of certain state roads," was read third time, and

Resolved, That it pass.

The bill from the House of Representatives, entitled

"An act to authorise the Governor to incorporate a company for making an artificial road from the borough of Northampton, in the county of Lehigh, to the borough of Wilkesbarre, in the county of Luzerne," was read the third time, and

Resolved, That it pass.

Ordered, That the clerk return said bills to the House of Representatives, with information that Senate have passed the same, the former without, and the two latter with amendments, in which the concurrence of that house is requested.

On motion of Mr. Welles and Mr. Power,

The Senate resumed the second reading and consideration of the bill from the House of Representatives, entitled

"An act to prevent the fishing with seins in Penn's creek in Centre county, and to encrease the penalty for fishing in the river Susquehanna on days prohibited by law," postponed for the present yesterday.

The question on section 1. recurring,

It was determined in the affirmative.

Sections 2. and 3 were severally considered and agreed to.

Section 4. Having been considered,

On the question,

Will Senate agree to said section?

The yeas and nays were required by Mr. Grosh and Mr. Davidson, and are as follow, to wit.

any patent for a railway or steam-carriage being strong enough in this country to protect you"; did not believe that "Robert will take any part in the execution" of the plan; and considered "the rest of us not only unwilling but *unable* to assist." For some years yet the colonel must play a lone hand. At this moment he was delayed in playing it by fresh developments in the steamboat game, of which Rachel duly wrote to Richard.

"Gibbons," said she, "has an elegant boat; he runs at half price and says he will run for nothing, just to ruin Ogden." This referred to the most important of the new steamboat competitors—William Gibbons, a Jerseyman in residence but the owner of large southern plantations. His craft was the *Bellona*, with Cornelius Vanderbilt as skipper; many a brush she had with John R. Livingston's new boat, the *Olive Branch*. Presently, Livingston moved for an injunction to restrain both Ogden and Gibbons from the so-called New York waters, and the motion was argued before the celebrated Chancellor Kent. With regard to Ogden—presumably because of his compromise agreement with Fulton several years earlier—Kent declined to place any restriction. Gibbons was at first forbidden to navigate "with steam or fire, the waters in the Bay of New York or in the Hudson between Staten Island and Paulus Hook." Later, Kent had a change of heart and modified his original decree to "have no operation as to any waters on the westerly side of the middle of the Hudson River and the middle of the Bay of New York." This recognition of a two-state jurisdiction over these dividing waters set Gibbons all the more fiercely at Ogden's throat and encouraged Colonel Stevens to back Gibbons.

For himself, the colonel had just entered suits in Philadelphia for patent infringement. Since he proposed using

Fulton's patents, under the old agreement, he found peculiar interest in a letter from Horace Binney, April 13, 1819:

. . . We apprehend invincible difficulties. . . .

The patent of 1809 to Mr Fulton appears to be confined to his discoveries or inventions in the construction of Boats to run 1 to 6 miles the hour—which inventions consist in ascertaining the proportions between the resistance of the boat, power of the engine, and extent and velocity of the wheels. However meritorious may be the tables and calculations which he gives, there are decisive objections . . .:

1. It is not a machine that the Patentee claims to have invented, but tables for the construction of such a machine as to produce a given effect with certainty. This is not a patentable discovery.

2. These proportions, as stated by him, are not accurate because the specifications state, in the strongest terms, Mr Fulton's conviction that a Steam Boat cannot be made to go six miles per hour with a cargo and passengers, and pay expenses. If his calculations lead to this result, they are erroneous because their result is false; since all the boats on the Delaware run more than six miles per hour in still water—with the Bolton and Watt engine.

3. The Boats whose proprietors we have sued are not made on the principles and proportions stated in the Patent. I do not take into consideration what is alleged on the other side as to the originality of these discoveries, because this is the defendant's case; I advert only to what meets us on the Patent itself and in the evidence we must produce.

The Patent for the year 1811 is for a number of distinct and unconnected inventions and, without going over all of them, I will merely set down . . . the objections.

1. The Patent, being for 10 or 12 distinct improvements, such as wheels, wheel-guards, kelsons, coupling-boxes, mode of combining the parts of the engine with the Propeller [side-wheels] etc, etc, all unconnected and independent, is bad because it is contrary to the plain intention of . . . Congress not to permit distinct machines or improvements to be united

in one Patent. A machine, however numerous its parts . . . may be patented; but not two or more machines, or two distinct . . . parts of a machine, unless they are claimed as improvements upon [one] already invented and in use.

2. Many things in this Patent are not patentable at all, therefore the Patent would be bad for claiming them. Such as: The position of the pilot in steering; the use of sails; steamboats of a size to displace more than 50 tons of water; the position of the air-pump and machinery behind the cylinder.

3. Of some things, he is clearly not the inventor nor does he appear to think he is; but founds the exclusive right to use them on his first using them in steamboats—which is no reason. As: The use of coupling-boxes to throw the wheels out of gear; knees on the sides of the boat adjacent to the machinery, etc.

Such being the difficulties . . . we cannot think of putting the parties to additional expense (my advice to you is not to incur it) without this full communication. . . . You know that, after meeting all these difficulties, we are to encounter whatever testimony the defendants may bring as to the original invention and use of wheels or other parts of the machinery claimed by Mr Fulton. Of some, I have no doubt, he *is* the inventor; of others there is much doubt. But the impression is that we should never reach the point in the cause where these doubts became material.

It is impossible to state the Fulton case more clearly. Binney's opinion had been reached after conference with the leading Philadelphia lawyers; it supported the colonel's long-held belief and convinced him of the futility of trying a test case on the Delaware. On the other hand, it encouraged him to turn back to the Hudson, to which his attention had just been particularly recalled by Dr. Hosack. As health officer, the doctor wanted the colonel's suggestions for improving city living conditions of all sorts. Seizing the opportunity, the colonel repeated his earlier recommendation of steam fire-boats, with additional equipment for washing the

city's street. If Fulton were no stronger in his patents than Binney said he was, the colonel, in defiance of the monopoly, might build such boats for New York. Their efficiency would be increased by favorable action upon another recommendation to Hosack.

. . . A permanent face, formed of hewn stone, instead of pine logs, should be given to the wharfs . . . from the Battery along the East and North Rivers. The piers projecting . . . for the accommodation of shipping should be so constructed as not to interrupt the free passage of the current. . . . This, no doubt, will prove an arduous undertaking; but the longer it is delayed, the more will these difficulties be multiplied. . . . A plan has occurred to me which I shall be ready at any moment to submit.

This was not, with the colonel, a new idea. Almost immediately upon his return to New York after the Revolution, he had urged the value of permanent docks upon the corporation of the city, while his own little dock behind No. 7 had been built with this in view. Turning over his old papers for arguments upon this point, he came upon some notes which led him to add another suggestion in the same letter.

. . . Immediately connected with the above improvement is the formation of public sewers, which the want of descent from the great extent of made ground fronting the water has rendered absolutely necessary.

Proper city sewerage had always been an interest of his. To Hosack and to Peter Augustus Jay he had written much upon his designs for closets, drains, and other internal plumbing, while association with the Manhattan Company had made him doubtful of its wells as dangerously exposed to seepage. This led him to add, in the letter just quoted, a hint on additional city water supply.

. . . I come now to the consideration of the great and ultimate object to which every citizen ought to look forward anxiously, to insure health. I mean the introduction, from a distant source, of pure and wholesome water. . . . When this state is . . . engaged in forming canals . . . on two different routes . . . of nearly four hundred miles, surely no hesitation or boggle can arise over forming a canal of less than 20 miles . . . without a single lock. . . . My object is to conduct the waters of the Saw Mill River . . . into the city . . . This stream affords . . . excellent water.

Here is the only instance of the colonel's recommending a canal of any sort. He suggested this one at a moment when most of his energy was again directed toward railroads—in Pennsylvania because New Jersey was still disappointingly apathetic. By addressing such leaders as Stephen Girard, he thought, much might be accomplished. A letter from Horace Binney shows what he had in hand.

Dec 28, 1820

I have received your "Hints" and "Further Hints" and it would give me great pleasure to promote any of your views in reference to this object. At present, I am not of the Council of the City, and the only road connecting with the Pittsburg Road has been paved in the usual manner with stones. Indeed, as there is now a stone turnpike road from Phila. to Pittsburg, there would be great opposition to any Rail Road between these points; while probably the cost of such a competition would be greatly exaggerated, since the routes would probably not be the same for any great extent. When I say there *is* a turnpike . . . I am perhaps not strictly accurate, but . . . completion is not far distant.

I am just out of my chamber after nearly three weeks with Quincy.

The "Hints" and "Further Hints" were pamphlets, drawn up and printed by the colonel for Pennsylvania's

legislature, in which that body was besought to authorize a railroad between the two leading cities of the State. Why, asked the colonel, might not "the mode of communication undergo such an improvement as to admit of the products of the west being profitably brought to Philadelphia?" He ventured "to say that a long period of time must elapse before we can possibly see efficient canal navigation from the Delaware to the Ohio. Such a communication (should it ever be effected) would be of incalculable advantage. But, in the fond hope and expectation of ultimate success; in grasping at a shadow; the substance would be lost. Long before the accomplishment of so extensive a work, the commerce of Philadelphia would be diverted into other channels and lost irrecoverably. The present moment is critical." And much more to the same purpose.

> A railroad . . . will insure to the farmer a fair price for what he brings to market. . . . From the want of capital, and the great length of time navigation [on a canal] is closed, the farmer is compelled to sell on credit at reduced prices, and to purchase whatever he may need at advanced prices. . . . The canal is useless at the very season when most wanted—when the farmer has leisure to thresh out his grain and bring it to market. . . .
>
> Diverging from a centre like the rays of the sun, railroads will diffuse light, heat, and animation to every extremity of the Commonwealth. . . . There needs but a beginning and there will be no lack of funds. . . . Let but one mile of the proposed railway from Philadelphia to Pittsburg be completed wherever it may be deemed most expedient. . . . Let experiments be so varied and multiplied as to test, in the most satisfactory manner, the true merits or demerits.

Finding Philadelphia quite as lacking in enthusiasm as Binney had predicted, the colonel promptly shifted the attack to Harrisburg. Answering the objection that "between

THE FIRST AMERICAN LOCOMOTIVE ON RAILS AT CASTLE POINT, HOBOKEN

that city and Pittsburg very great elevations occur," he insisted that a railroad would scale the Alleghany or any other mountains, provided the grade were made low enough to the mile. He quoted Secretary Gallatin on the "impracticability, in the present state of science, of effecting a canal navigation across the mountains," and argued that New York, with her canals, would soon outstrip Pennsylvania unless the latter took advantage of her opportunities on land. "It is not," said he, "necessary to calculate exactly the rapidity with which passengers *may* be conveyed. It is . . . probable that the whole distance may be traversed in a single day, without . . . the slightest degree of fatigue." As for freight, while it "is necessary to shift the loads from the team to the canal and from the canal to the team, every article taken on a railroad may be taken from your very door and carried to . . . its destination without being touched." Given merely the right to incorporate, without any funds from the state treasury, he was confident that the cost of building would readily be underwritten by private capital.

Not to neglect New York, the colonel wrote to Stephen Van Rensselaer:

> . . . I applied to the Legislature . . . for . . . erecting a railroad between Albany and Utica. . . . This memorial was ordered printed by the House. . . . Considering the deep interest now prevailing in canals, it is . . . not surprising that no further action was bestowed on my project. . . .
>
> I next addressed myself to the President of the Albany and Schenectady Turnpike, but he—conceiving, no doubt, that a Rail Road would be incompatible with a turnpike, declined having anything to do with it. . . . I will now come to the point. . . .
>
> Induced to believe you would not hesitate to take an active concern . . . provided no loss would be incurred . . . I pro-

pose . . . in order to gain an easy ascent, that the railroad pass up the ravine through which the stream . . . in front of your mansion pursues its course, and terminate on the banks of the Hudson in your immediate neighborhood. . . . Your brother informs me that you own the soil for one-half the distance to Schenectady. . . . The owners of the remainder should be . . . interested. . . .

[Thus] the whole of the transportation could be performed by the [land] proprietors themselves and, in lieu of toll, the whole profit will be put into their hands. I have now to request of you not to determine too harshly respecting the feasibility of the thing.. . . Could I have an interview with you, [when] you have occasion again to visit New York, I should be extremely happy to see you at Hoboken.

The great capitalists were not yet to be tempted to an experiment—even by the prospect of a privately owned railroad. It naturally followed that Federal help was no more probable than was suggested by Senator Rufus King's letter to the colonel:

I have had the honor to receive your letter. The subject is important but, at this stage of the session of Congress, when little has been done and much remains to be done, there seems to be no opportunity for the consideration of the Measures which you recommend.

I feel much respect for your experience, and for those principles which you may have verified; and shall be glad that you should have an opportunity of demonstrating their public utility.

Even to-day the ring of this letter is familiar; to the colonel it was sadly so. He never grew accustomed to being "let down easily," and when he threw that letter into a pigeonhole with the rest that said so much and meant so little, he was as near as he ever came to giving up the fight. His personal affairs were coming to a crisis; heavy obliga-

tions were falling due, and the lots at Hoboken were not selling. At seventy-two he might have taken Jefferson's hint and shut up shop altogether but for his sons.

Three of them particularly came to the front. Edwin was now obviously the business head of the family; to him, by a deed of trust, his father conveyed the whole of the Hoboken estate. He found the money through which John Cox and Robert could incorporate themselves as a ferry company and also build what had been so long wanted, a new steamboat for the service. They named her *Hoboken*, and it was of her that Rachel wrote to Dr. Richard, then transferred to the *Dolphin*.

> Had you stayed one day longer, you would have seen the Steam Boat launched. She went off elegantly and in the evening all the Hobokites had, as you sailors say, a fair blow-out. Robert was in high glee.
>
> It was a kind of high life below stairs. City beaux and Bergen girls—a farce to be seen, but *it was for that night only*. . . .

Richard's sister Mary gave him added details:

> . . . The boys said the frolic would have suited you exactly, but I did not go down. In the evening, they had a dance. They sent for a fiddler and all the Bergen belles; three wagonloads of them. The best of the story is that Captain Kidd—upon the inspiration of the whiskey punch, they say—fell to dancing and never got home until one o'clock. After the dance there was a free for all battle between the ship's carpenters and the ditchers. The ditchers got worsted and swore revenge. For three nights every soul in Hoboken was in fear of their lives. It came to such a pass that at last the military had to be called out to restore order.

Evidently an incitement to rioting ashore, the *Hoboken* also embodied revolutionary ideas afloat. Her engine, de-

signed by Robert, was a modification of the one in "Old Sal"; in line with his now regular practice of using steam expansively, it was fitted with his newest type of "cam-board" cut-off. Another step ahead of rival builders was his substituting, for the old heavy cast-iron walking-beam, the wrought-iron skeleton type afterward generally adopted. He shortened the length of the beam in proportion to the stroke of the engine and added a wooden "gallows frame" support later to be replaced by a similar type in steel. To simplify handling a double-ended craft in the strong Hudson tides, he drove long piles into the river bottom and combined these with fenders of oak and hickory, the whole forming a spring-slip. This has ever since been in use on the Hudson and, in 1836, it replaced, on the Brooklyn side, Fulton's ingenious floating docks. With such innovations the *Hoboken* made trips over the Barclay Street line "every hour by Saint Paul's Clock," while the older horse-boats kept up the service at Canal Street. Richard, cruising on the *Dolphin*, heard something of the speed of the service from Thomas Conover, a fellow naval officer.

> . . . The new boat is certainly the fastest if not the finest ferry-boat in the United States. She crosses with ease in eight minutes, while the foaming and majestic Hudson complains of the weight of human flesh and blood that clothes her spacious decks. . . .
>
> I wish you were here, old boy, to taste once more the pleasures of a Hoboken spring, & to witness the delight so fully portrayed by old Van Buskirk's countenance, on a Sunday evening, when he stands with his hands in his breeches pockets, rattling the day's takings.

Conover himself knew all about spring in Hoboken, for he was very much in evidence there. Gold lace and blue had introduced into the villa their usual hint of romance, and the

Stevens daughters' hearts were set fluttering when Conover stepped upon the veranda. All of them, that is, except Juliana's; her heart had been buried with a lover who had died before her breakneck stage journey to Philadelphia had brought her to his bedside. Her sisters rallied her gently, then openly resented her persistently wearing black. With Tom Conover coming to a special dinner, they insisted that she should make some effort in keeping with their own busy stitches and new ribbons. Flatly refusing, she mortified her sisters by appearing at the dinner-table in mourning and saying never a word. But she spoke to a purpose that enraged her sisters—and her parents—not long afterward. Walking in among them one day, she quietly announced that she had just been married—to Tom Conover. Regardless of any personal feeling toward Conover himself, the colonel stormed over this gross irregularity. Rachel, horrified, alternated between scolding and pleading; as a unit, her brothers and sisters turned their backs upon the bride. Richard, at sea, remained the bridegroom's only friend.

Thus it was from Conover, as often as from the sisters, that Richard received long accounts of the season's gaieties across the Hudson; all sorts of affairs in which Robert was most often the family's representative. Robert's passion for music—of which he was held to be a judge—led him to every concert, and he never missed such events as "Mrs. Schemerhorn's great ball in Mechanic's Hall," where the invited guests numbered four hundred and fifty. It was there that he led out that acknowledged belle, Miss Eliza McEvers, regarded by her father as too young to make her *début* for the assembly but critically labeled, by her rivals, "already out." Again, it was Robert who preferred "the supreme felicity of Esther Coxe's hand for one cotillion" to attendance upon his mother at the performance of "The

Coronation of King Henry V, a representation in honor of George IV, and very splendid with scenery costing 7000 dollars." So, at least, said the family letters—and their writers must have known. Certainly Robert, light-heartedly wearing his heritage of looks from his mother's famous family, long held his place on the list of New York's eligible beaux. However, no society queen ever captured him. He was not to be lured from Madame Otto, the noted singer who remained for so many years the object of his most intense devotion.

For some time Robert kept bachelor's hall in Barclay Street, and it was there that Abram Hewitt met him. Hewitt and his Columbia classmates were playing baseball in the college grounds when a long hit went the way of many earlier ones. The ball disappearing in a neighboring back yard, a search of the whole team's pockets could not produce the price of a new one, and Hewitt was appointed the committee of one to ring the neighbor's front-door bell. To "a middle-aged woman with a benevolent face" he was explaining the situation when "a gentleman appeared in the hallway."

"Do you want a ball—and will you be satisfied with one?"

"Y-yes, sir."

"Margaret, get the basket! Now, sir, here are some twenty-five balls. Are they all yours?"

"I—I suppose so."

"Well, every one has broken a window in my music-room."

"Oh—we didn't do it on purpose—"

"Very well. Now take them and begin again. When you've broken all my windows, go over to Hoboken and you'll find a nice field there, with plenty of room."

No doubt, Robert referred to the field which John Cox was afterward to devote to the introduction of cricket into

America and to the laying out of a diamond upon which many an early championship was fought to a finish. Hewitt, however, has left no record of having acted upon Robert's hint, though he did describe Robert himself, at the moment of their interview, as having "the most genial and lovely face" he had ever seen.

Except for the colonel himself, most of the eloquence in a family that had very little of it was claimed by John Cox. "Your Papa," wrote Rachel to Richard, "has petitioned the legislature of New York to grant him the right to run a steam ferryboat. John [Cox] is now at Albany to get it." Perhaps this mission was the result of his long-past success in London; in any case, John Cox was soon describing to his father the situation in Albany:

> If you can establish the fact that you navigated the Hudson before the law of '98, giving Robert R. Livingston the exclusive right, I think there will be no doubt of success. . . . The law [now] goes so far as to give Livingston and Fulton the exclusive right of building and constructing . . . boats and engines . . . in the waters of the Hudson. If you can get an affidavit from M'Queen or any body else that he built a boat or engine prior to '98, it will go to prove that the legislature had interfered with a right *vested* and *exercised*. . . . You see the point? We turn their own battery of vested rights upon them. You need say nothing about the mode of construction.

Petitions somewhat similar to the colonel's were pouring into Albany from all sides. In Fairfield county, Connecticut, "upwards of twelve hundred names of citizens of the first respectability" appeared upon a memorial urging that the grant to Fulton could never have been intended to include the sound. New Haven protested against the monopoly, whereupon the Fulton Steamboat Company insisted that the very protestors had refused an opportunity to buy shares

in it. Were the East River thrown open, said this company, such action would "mean the extinction of steamboats." From New Brunswick, the "Mayor, Recorder, Alderman and Common Council" set forth the unjust interpretation of New York acts so as to include their home waters, thus precipitating retaliation by New Jersey. "Considering," said New Brunswick, "that . . . the two states, as part of the same nation, cannot properly resort to force," the actual seizure of vessels by either should be suspended until the Supreme Court of the United States should resolve all doubts.

Under pressure of popular opinion, New York yielded a little. Her legislative committee of March 16, 1822, recommended that the original grants to Fulton and Livingston be regarded as designed merely to give "further encouragement" to these gentlemen. Subsequent legislation, giving them rights of seizure over other men's craft—"as if the same had been tortiously and wrongfully taken out of their possession"—ought to be repealed, said the committee, as unwarrantable infringements upon the constitutional rights of others. A startling doctrine for New York, but long-awaited light through the clouds for Jerseymen like Stevens and Gibbons.

The colonel was so pleased that Rachel could seize upon his mellow moment to win a struggle of her own. Immediately she sent off a letter to Richard:

> . . . It will give you pleasure to hear that your father and I have forgiven Juliana—though your father will not receive Mr Conover. John & Robert displease me very much by not seeing and forgiving their sister; as yet they have not spoken to her. I think when a parent forgives, brothers and sisters have *no right* to reject. James & his wife have been to see them & given them an invitation to their house. Mr C seems very

anxious to get to sea. The *Erie* is fitting up but I expect it will be a long time before she sails. I wish he could get the command of a small vessel & cruise against these horrid piratical vessels. James has another daughter.

Upon one of Rachel's points the colonel had a word to say to President Monroe, although this was not written until the autumn.

The depradations committed on our commerce by pyrates have arrived at such an intolerable extremity that it has become the indispensable duty of Government to adopt every possible means of protecting its citizens against the horrid cruelties, as well as loss of property, they now sustain in the prosecution of the West India trade. Under such circumstances, I conceive it an imperious duty to tender my services.

A steam boat (Hoboken) is now plying between New York and Hoboken, capable of moving through the water with a speed of more than nine miles an hour. She is 98 feet long on deck and 26 feet wide, with a draft of . . . only 3½ feet; of about 200 tons burthen and between 9 and 10 feet deep in the middle of her hold. She . . . affords comfortable accommodation for one hundred men at least. . . .

I am in possession of the means of giving a vessel of similar size and construction a speed, through the rough water of the ocean, nearly equal. . . . As the propellers of such a vessel would be *always* under the surface . . . they would never be injured by a heavy sea or . . . fire from an enemy. She can also be rendered impervious to shot. . . .

A vessel of the above description, carrying one long piece of ordnance in her bow and swivels on her sides . . . firing elongated shells . . . would . . . in a very short time demolish every pyratical craft of whatever nature; great or small, whether at sea or in harbour. . . . I shall detain you, sir, no longer than to add that I stand ready to furnish Government with one or more such vessels—and to request a speedy answer.

There is no record of any answer at all from Monroe, but one of Conover's letters to Richard is pertinent:

Pirates . . . in the West Indies are so daring and outrageous as at last to rouse the nation to a sense of duty. Com. Porter is appointed to command of the Squadron. His flag will be on *Enterprise* (steam boat) and ten small schooners for that special service in addition to what are already employed. The Government I think, are indebted to your Father for this new mode of Warfare—he suggested the plan to the President some time ago, before Congress convened. I thought the plan a very feasible one; at all events, the Govt. have adopted it.

Meantime, a still faster boat had been added to the Hoboken lines—the *Pioneer*, with "ladies' cabin below deck, carpeted and warmed by open fireplaces." Contemporary notices in the newspapers describe her as crossing the river —"a mile and one-third in breadth at Canal Street—in about seven minutes going, seven-and-a half returning; a velocity unequaled, as yet, by any steamboat." Rachel's letter to Richard—addressed "care U. S. Navy, Pacific Ocean"—gave further details:

Your brother has built such an expensive boat and made such alterations and improvements that it has taken all the cash they could obtain in every way. They have a fair prospect of realizing something very handsome but not immediately. . . . The turnpike road they have made from Hoboken to Coulter's Tavern has cost an immense sum; but they carry over more passengers, & quite as many carriages, as the Paulus Hk. boats, in consequence of the road being so very fine. The accommodation on board the Hobok. boat . . . takes so much with the women of *all* descriptions that they *will* cross here. In a year or two, I expect, we shall begin to make some money but, for some time yet, we must *all* be poor. I have paid your debt to Mrs Dorington as I could not bear to think of her losing the money. Your Papa couldn't pay it, so I did it from my private purse.

Juliana has a sweet little baby boy that I have named

Frances Stevens Conover. In all my pleasures, some drawback —your brothers Robert & John will not notice Conover, his wife, or child. They have never spoken to Juliana since her marriage. James & Edwin are very friendly & kind to her. Papa . . . at my entreaty, is polite to him. I never invite Conover when Robert is at home.

Papa is well; at present in Harrisburg, Pa. He wants to build a R.R. from Pittsburg to Harrisburg. I tell him if he gets the act he will never get a subscriber, but he expects to make a fortune by it.

Catherine Sophia, youngest daughter of the house, was no more optimistic than her mother over "Papa's scheme he calls railroads, which is to make us all heiresses." But she threw a little more light for Richard upon the popularity of the *Pioneer* by explaining that the boat carried "two large looking glasses." Hers, too, was the account of the usual celebration by the workmen over the launching and of the hard fate of a gentleman recently connected with her brothers in ferry management.

Poor Commodore [John] De Peyster will not forget the ball in a hurry, for they tore half his coat off because he could not comply with their commands and dance a jig for the amusement of the company. I cant help laughing at the idea of his jigging, in spite of his unlucky coat.

Harriet, Hetty, & I intend sallying forth . . . as soon as we can get rigged out in a proper manner, to go to Trenton. I expect to have a very pleasant jaunt, & in fact it could not prove otherwise, were it not for that pert [Juliana]. She is worse to have in the house than a disease, as you frequently used to tell your tormenting sister.

I forgot to tell you that they called the new steamboat Corinthia, after some new publication . . . under the title of Corinthian Tom (an appellation for a dandy, I believe). Harriet expects company here to tea & has lost the keys to the sideboard (in which place is deposited all the fruits of her

morning labours) & is making such a searching and huzzaing about them that she has driven every idea from my brain but that of the keys—and the company's hard fate who will be obliged to dispense with the delightful relishes she had in reserve and eat plain bread and butter.

Robert is in Washington. John, so busy with balls and dinners he hardly finds time to come over and see us [from his house in the city].

In a moment snatched from his trips to Harrisburg and Philadelphia, the colonel read a communication from Charles King, secretary to the committee of the Greek fund in New York—an organization inspired by the same struggle for Greek independence that fired the soul of Lord Byron. Answering King, the colonel offered to build, for $25,000, a vessel like the one he had offered Monroe. Again he specified that screw-propellers be used, and dwelt upon the advantage of thus protecting the machinery under water. "Impenetrable to shot; possessing a speed unequalled by anything afloat," he concluded, "such a vessel could set any assailant at defiance. Having it in her power to take the position best suited to her purpose, she could not fail to demolish the entire Turkish navy—or compel every ship to quit the sea." Perhaps the reason for not building this ship lay in the committee's failure to raise funds; perhaps it rested upon a lack of appreciation of the future of steam and armor; or perhaps the colonel himself lost interest after he had completed, with Robert, James, and Edwin, financial arrangements to build another steamboat on the Delaware. This craft had split-buckets on the paddle-wheels, a design of Robert's, as were other features described in "The Philadelphia Freeman's Journal":

The TRENTON is constructed upon an entirely new mode. Her boilers rest upon the guards projecting over the water

from each side. This leaves the deck entirely unobstructed and forms what may be called a promenade deck. The space usually occupied by the boilers is converted into convenient and handsome dressing rooms. Should any accident occur, to the boilers, the water would be thrown directly into the river and not in the least endanger the passengers. And, what is more important, the annoying degree of heat in the dining cabins is not felt. She was built at Hoboken, and it may be fearlessly asserted the improvements in the arrangement and disposition of the machinery, are far greater than any made since the first introduction of these boats into our waters.

In detail, the *Trenton* was 229 feet long, by twenty-three feet beam and eight feet in depth. With a thirty-eight-inch cylinder and a seven-foot stroke, her power and speed represented another advance for Robert, and led Scott Russell, with other engineers who lived a little after him, to acknowledge him as the greatest among the leaders in both hull and machine design. It was in the *Trenton*, as the queen of his Delaware fleet, that Robert experimented with anthracite coal, which he had already successfully burned in a cupola furnace ashore. He first ran her as one of the Union Line, later shifting her to the Hudson—after the great day of American steamboating had dawned.

CHAPTER TWENTY

It was a great day, in February, 1824, when Daniel Webster and Attorney-General Wirt, for Gibbons, met Thomas Addis Emmet and T. J. Oakley, for Ogden. Already Gibbons and Ogden had fought through all the lower courts; one to break, the other to save, the Hudson monopoly. Innumerable witnesses had been cajoled or badgered by countless lawyers; reams of testimony had been taken, revised, and perhaps struck out of the record. Charges of perjury had been freely brought and as vigorously denied; occasionally the point of bloodshed had been almost reached. Now, at last, the legal giants had it in hand; with John Marshall on the bench it would definitely be settled whether Gibbons, Stevens, or any other man might run steamboats on the Hudson—or whether the Livingston-Fulton contingent could still keep the river in a private pocket. No small part of the fame of John Marshall as the soundest interpreter of the Federal Constitution rests upon his Steamboat Case. Within a few months past the precedents he then established have been invoked in connection with the proposed bridge across the Hudson at 170th Street.

In his decision he flatly contradicted Kent—and Chancellor Livingston—in the contention that the powers of the central Government, *as representing a grant by sovereignties or States*, must be strictly construed. "The Constitution," said he, "contains an enumeration of powers expressly granted by the people to their government, and there is not a word in it which lends any countenance to the idea that these powers should be strictly interpreted." The men who

had framed the Constitution "must be understood to have used words in their natural sense and to have intended what they said." If, from the imperfections of mere language, any doubt arose, then "the known purpose of the instrument should control the construction put upon the phraseology." The grant made by the several States to the Federal Government does not, as Marshall read it, "convey power which might be beneficial to the grantor if retained by himself . . . but is an *investment* of power, for the general advantage, in the hands of agents selected for the purpose; which power can never be exercised by the people themselves but must be placed in the hands of agents or remain dormant." Having stated these broad principles, Marshall proceeded to explain their application to the case in point.

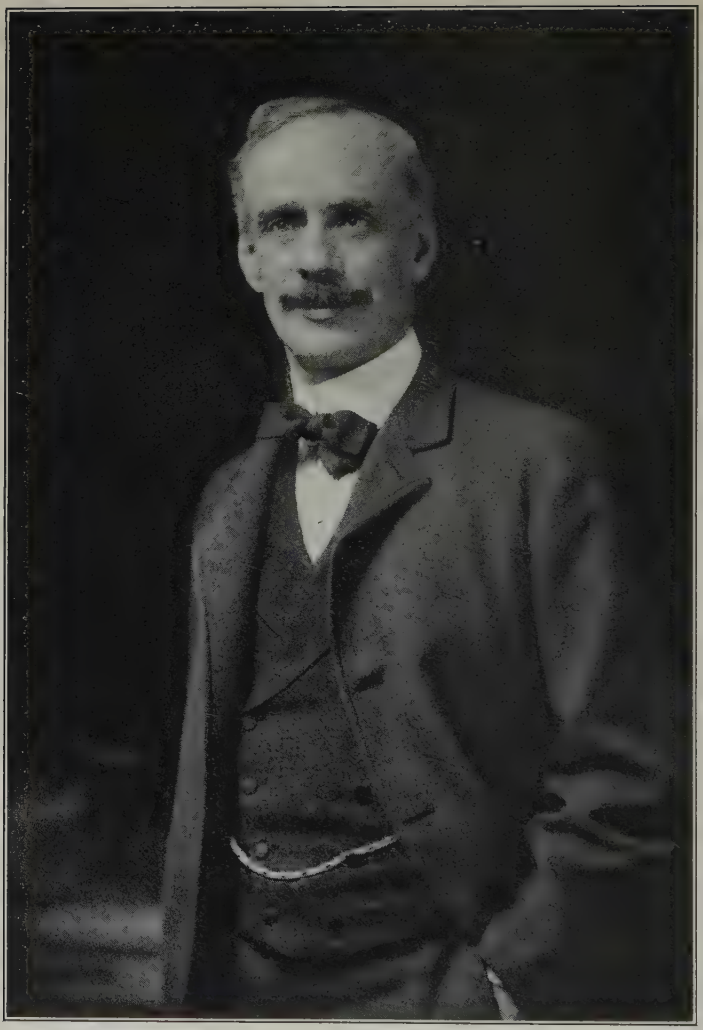
"Commerce," said he, "undoubtedly is traffic. But it is something more—it is *intercourse*. The power of Congress over commerce is complete in itself, exercisable to its utmost extent, without limitations other than are prescribed by the Constitution itself. If the sovereignty of Congress is plenary as to these objects, the power over commerce with other nations and among the several states is vested in Congress as absolutely as in a single government." Such power could not be confined by any mere question of state lines but must act everywhere. "It may, of consequence, pass the jurisdictional line of New York and act upon the very waters to which the prohibition now under consideration applies!"

Marshall said much more than this, and said it clearly. He admitted that States might enact many kinds of laws incidentally affecting commerce—quarantine laws, police laws, bridge laws, and so on. None of this was relevant, because all such state legislation was by virtue of the State's power of internal police, not by virtue of any concurrent authority, with Congress, over commerce either domestic or

foreign. Any state enactment, he pointed out, must therefore give way to the supremacy conferred by the Constitution upon acts of Congress. Where Kent, among others, had contended that Gibbons merely had the right to operate *coastwise*, Marshall drew no distinction between "up and down" and "across," but, in this respect, included the Hudson in the Atlantic Ocean. Thus, at last, the knot was cut—leaving Ogden ruined by years of litigation and Gibbons so crippled that he was willing to merge his interests with the Union Line.

Marshall's decision proves that the license as a practising lawyer, issued to John Stevens fifty years before, was fully deserved. What the Chief Justice handed down formed a close parallel to what the colonel had written to Livingston and Fulton in 1809; indeed, the very language used by Marshall is so close to the colonel's that, rather than a paraphrase, it is the thing itself. All the figures so laboriously set up by Livingston—the fiddler who interrupted the Stevens children, the cart with wide wheels, and the vender of patent medicines—were so battered by Marshall that they revealed the clockwork and wires that gave them motion. They were no longer fit for anything but the junk-heap.

With the Hudson at last wide open to steamboating, the colonel became more and more inclined to leave this great activity to the sons he had trained for it. Robert immediately began plans for building more Delaware boats in order to have some to spare for New York. James formed a new line of stages, to run during the winter, between steamboat seasons, and furnish one day transportation from Hoboken to Philadelphia—an enterprise in which Gibbons became a partner. With Edwin and John Cox serving as advisers and managers, the ferries were making money. A great dream of the colonel's had come true, and he turned to



COLONEL EDWIN A. STEVENS, JR.

harder work upon the realization of another. The latest of his earnest pleas for railroads had not long been issued.

The wealth and prosperity of a nation may be said to depend, almost entirely, upon the facility and cheapness with which transportation is effected internally. . . .

From the vast extent . . . of the United States, and the relative geographical position of the States individually, the necessity . . . of ready intercourse becomes . . . politically, of immense importance. A supposed want of identity of interest between Eastern and Southern States was the pretext for . . . the convention at Hartford. . . . Should measures for . . . establishing intimate communication between the Atlantic and the Western States be long neglected, the consequences may prove fatal to the Union. . . .

The Grand [Erie] Canal would . . . divert a large portion of the commerce of the Lakes to the Atlantic . . . through . . . New York. But whether or not . . . it will ultimately prove "for the benefit and happiness of posterity" is at present extremely problematical. It behooves the General Government to resort to more direct, speedy, and less expensive means. . .

Would it be sound policy to acquiesce . . . in giving a still greater preponderancy to the present commercial supremacy of this great and growing state [New York]? Niles Register, for August 15, 1818, says "Ten years after the canal is finished . . . New York will rival London. . . ." There is no calculating to what lengths the inordinate ambition of some discontented chief [in another State] might hereafter be carried. . . . "Let us," it may be said, "become independent, [with] . . . the immense business collected in our ports appropriated solely to our own use. Let us no longer be chained to the car of a sister state who has contrived to assume entire control over the Government." The following extract from . . . the *Columbian*, by a writer who signs himself "Cato," gives intimations of the spirit now actuating certain partizans: "De Witt Clinton, a man who is doing more for the benefit and prosperity of posterity than all the statesmen of Virginia together"!

I trust these intriguers will be disappointed in their darling project of elevating their idol into the Presidential chair by means of the Grand Canal. Long before . . . New York could accomplish so gigantic an enterprise [as its canals] the Government could carry railroads into every section of the Union and thus . . . eclipse the premature, if not abortive, efforts of this aspiring state or, rather, faction. . . .

Are the mouths of the Mississippi and the Hudson to remain forever the only outlets . . . for the Western states? I answer —NO! . . .

The length of the Grand Canal will be at least 350 miles. The turnpike from Washington [D. C.] to Wheeling on the Ohio is only 270 miles; it is presumed that a railroad would not exceed 300. At Albany we are 160 miles from New York, whereas merchant ships come . . . up to Washington. Merchandise can be transported from Washington to Wheeling without being shifted from one vehicle to another. From New York to Wheeling, by . . . the canal, it would be necessary to shift four times, and transport more than 1000 miles. . . . Were a railroad between . . . the Ohio and the Potomac to be carried into effect, it would become the greatest thoroughfare in the known world. . . . Any *calculation* respecting the extent of the intercourse . . . must fall infinitely short of *what must really take place*. . . .

The newspapers inform us that 3000 men, 500 pairs of horses, and 200 yoke of oxen are . . . employed in excavating the Canal. . . . The quantity of earth removed will be ten times greater . . . than for a railroad. . . . Besides, we are left at . . . liberty in choice of ground; we can also, at pleasure, *ascend* or *descend*, whereas a canal must be limited. Water can only be conducted downhill. . . . Should it be desired to pursue a direct course . . . in the ascent of the mountains, it would merely be necessary to employ an additional power, which could be dismissed when the railroad resumes its usual course. . . . Taking all these circumstances into consideration, it may truly be said that the fostering aid of government towards . . . bringing into use an improvement of such vast promise, would redound more to its credit than all the

victories and all the conquests of all the heroes that ever existed.

In trying to drive a wedge through the Alleghanies from Washington, he was not neglecting to pound away at the one already entered from Philadelphia and Harrisburg. One appeal for influential help went to Stephen Girard, because "to a gentleman who has patriotically embarked so large a capital towards perfecting the line of communication between the Schuylkill and the Susquehanna, by means of a canal, I need not say how much it will redound to his profit, as well as to his honour, to continue—by means of a railroad—the line from the Susquehanna to the Ohio." In making similar appeals to other Philadelphians, the colonel distributed his remaining copies of the documents of 1812 and then reprinted a part of them for mailing. "And I spent the greater part of last winter at Harrisburg," he wrote. "With the greatest difficulty and opposition, I got a bill through for forming a company to erect a railroad from Philadelphia to Columbia on the Susquehanna!" Triumph, he thought, was his at last.

The date of this act was March 21, 1823. "On the memorial and representation of John Stevens," an iron railroad was authorized. A board, including John Connelly, Michael Baker, Horace Binney, Stephen Girard, Samuel Humphries, all of Philadelphia, with Emnor Bradley of Chester county, Amos Ellmaker of Lancaster city, and John Baker and William Wright of Columbia, constituted "The President, Directors, and Company of the Pennsylvania Railroad Company." These men were empowered to erect the road, "under the superintendence and direction of John Stevens," in such a way that its elevation should never exceed two degrees above "the plane of the horizon." The

freight rates established were seven cents a mile on each westbound ton, three and a half cents on each eastbound ton and, for small articles weighing less than one ton, more in proportion up to 20 per cent. Six thousand shares, at one hundred dollars, were to be subscribed, but there was a stipulation that, when the road had been completed, its actual cost should constitute the capital of the company. This was intended to provide for additional subscription if the estimates were exceeded or—presumably—to provide for returning to original subscribers any balance remaining after construction. As patentee of railroads, the colonel was to be given any profits in excess of 12 per cent.

In consolidating the hard-won position he lost no time. On Monday, July 14, 1823, says his journal, "I left New York in company with Mr. C. Loos, in the steamboat *Bellona*" and on the fifteenth, "went down on S. B. *Phila.* to Philadelphia." There he "procured an instrument for taking the angles of elevation and depression" and set out to survey the line himself, not in complete detail but with the idea of choosing the least hilly and most desirable route. On his way through West Chester to Carpenter's Tavern, he turned aside to call upon Emnor Bradley, "to inform him there would be a Directors' meeting at Phila. on 29th July." Bradley must have been a skeptic, for the journal adds: "He finally expressed his willingness to attend, if alive and well"—no doubt the only condition upon which the colonel would consent to leave. "Much rain in the night and morning," runs the next entry, "but went on eighteen miles to Henderson's Tavern at the entrance of the gap. One of the most hilly roads I have ever traveled; so much so that I have abandoned all idea of carrying the railroad . . . anywhere on the south side of the ridge . . . till it gets below West Chester." Pushing on, he wrote: "Left Strasburg

July 20th on horseback . . . and proceeded toward the Blue Rock on the Susquehanna. After fording Conestoga Creek, we encountered another precipitous ascent"—and so on all the way to Columbia. Next day he started back to Strasburg by way of Lancaster. Sometimes afoot, sometimes in a gig, but most often where he preferred to be—on horseback—he made his way back to Philadelphia with a good working knowledge of the country and a conviction that building the railroad would present no insuperable difficulties. He said as much to Richard.

. . . I have explored the route and find it not merely practicable but [this] at a very moderate expense. . . . It may, throughout its course, be easily reduced to less than one degree . . . in elevation and depression. . . . When the Susquehanna has been rendered navigable—a plan of mine for this is now before the legislature—this railroad will become the greatest thoroughfare in the United States—perhaps in the world. . . . You will find the question, who will be our next President, agitated with much warmth. The candidates are numerous, but I believe . . . a certain great personage in New York . . . at present behind the curtain . . . will ultimately be successful.

As he went about the city, describing his plans and laboring to stir up enthusiasm, he soon discovered that, more than anything else, it was the great length of his proposed road that staggered prospective subscribers. To encourage them, he drew up still another circular letter.

It is now generally admitted that a rail road is not a mere visionary project but . . . actually practicable. An erroneous idea has, however, prevailed among its opponents that it is only applicable to short distances and that . . . the contemplated extension . . . to . . . seventy-three miles . . . is ridiculous. . . .

Let us suppose that a section . . . be constructed in the immediate vicinity of the city, one mile in extent, in which elevations of two degrees actually occur. . . . Should it be practicable on such section . . . to cause loaded carriages to move forward and backward . . . would it not be fairly presumable that the effect would be precisely the same were a . . . road . . . extended ever so far?

An appeal is made to the enlightened patriotism and enterprising spirit of the good citizens of Philadelphia to step forward and, by an advance of five dollars, each, place the . . . improvement beyond all possibility of doubt. . . . Nothing more is asked than to engage to pay 5 Dollars . . . and each subscriber may pay the balance or not . . . [after] an opportunity of seeing part of the road actually built.

While his circulars went the rounds, private letters were sent to Mayor Wharton and many another influential Philadelphian. But—*seventy-three miles!* What we should now dismiss as the job of a mere section-gang appeared, a hundred years ago, positively transcontinental. Small minds were paralyzed and even great ones only half grasped the idea. In the enormous correspondence of Girard, for instance, there is hardly half a line to indicate any active interest he may have taken in railroading. To Girard and to the other directors the colonel pointed out that, since the act had not passed until the last day of the session, after much discussion, it could not be said to have "taken the members by surprise"; the directors had been chosen with deliberation and, by meeting to organize the company, they had in turn assumed a serious responsibility. It was theirs to show the world that America—although, alas! she had not, as he had planned, been first in the field—could still keep pace with the progress Britain had made in railroads. A Liverpool-Manchester road was in contemplation; would they not, with all speed, proceed on the Philadelphia-Columbia line? Should

the charter be "suffered to become extinct from neglect on their part, either individually or collectively, to perform the light duties required of them, most assuredly they would be answerable to the public." In every possible way he urged them to promote, advertise, and *build* the road—only to find that none of them had much conception. This being true of directors, little was to be expected of lesser men, most of whom were very much of the opinion that Gibbons, at this time, expressed to the colonel:

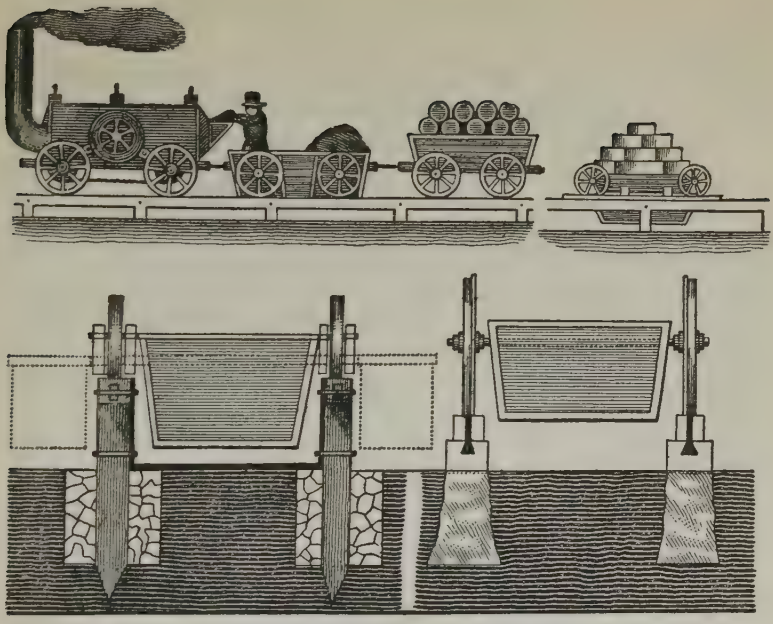
> . . . The plan you suggest [is] practicable, but the beneficial results to the individuals engaged in it are extremely doubtful; it being of that character to permit every one to use it with you—and, many times, to your injury. Situated as we are, it would not be politic, by means of our ingenuity and Capital, to furnish the means of success to our opponents.
>
> The difficult navigation of the Delaware now protects us from opposition to Trenton. The bad roads between Trenton and Brunswick operate to keep our opponents in check. We use the road in common with them & recommend our Line by the manner in which we overcome the obstacles that present themselves. If you remove them for your opponent by means of your exertion, you yield an important advantage.

Gibbons was speaking more particularly of a railroad across New Jersey, but Pennsylvanians were inclined to be just as skeptical of personal profit, and so forced the colonel to every sort of argument. To the general public he appealed on the grounds of civic pride, while to hesitant speculators he declared "there is *money* in railroads." Where his man appeared to have a scientific turn of mind, he pointed out how "the cheapness of transportation will reduce the price of coal, enabling us to substitute steam in place of every other power and apply it to every practical purpose." Of the "immense advantage of this," said he, "we cannot at

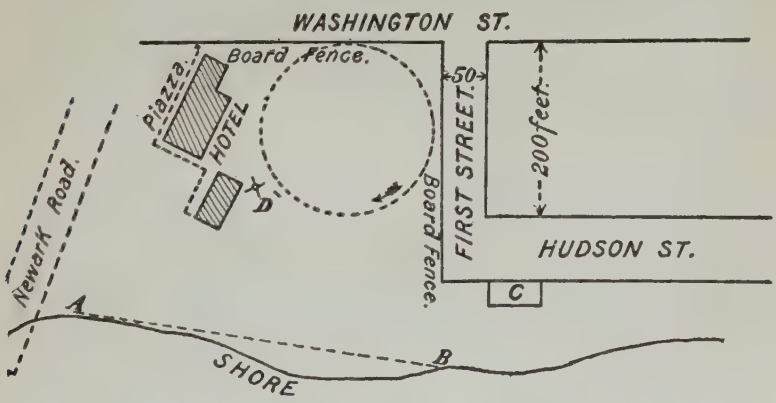
present form any adequate idea." As occasion very often demanded, he produced and explained his railway patent of June 8, 1824.

This patent shows how his theory of construction had developed through the years. He proposed to build foundation pillars of brick or stone, eighteen inches square and sunk two feet into the ground, leaving one foot above it. Upon these he placed blocks of wood, "firmly fixed thereto by bolts nearly in the form of the capital T inverted, passing through them into the stone or brick work." Next he laid longitudinal sleepers, consisting of two-by-twelve planks on edge, "in such a manner as to be three or four inches asunder at bottom and approaching each other so as to meet at the top," and secured to the block by "cheeks spiked on each side." Chiefly to prevent warping, but also to provide a broader base, wedges—"exactly fitted to the angular space between the planks"—were to be inserted at short intervals and also spiked. In the cradle formed by the upper edges of the sleepers a "cap-piece" of hard wood, three or four inches wide by an inch thick, was laid and to this was spiked the rail proper—a bar of wrought iron, three inches wide and half an inch thick. To run upon such rails, his carriage-wheels were to be fitted with "tires of cast iron" swung in a lathe to make them cylindrical and shod with two-inch flanges to prevent "the periphery from running off" the tracks. The gage of the road was four feet six inches.

All this effort was not without some result. If the directors originally chosen for the Pennsylvania Railroad did no more than had New Jersey's first commissioners, still there were others in Philadelphia who caught a measure of the colonel's enthusiasm. Forty-eight of these formed themselves into the Society for Internal Improvements, with the avowed object of studying railroads as compared with canals.



Tracks with rails on wooden posts, and stone pillars proposed by John Stevens, 1812.



THE EARLY STEVENS IDEA OF RAILROADS

THE CIRCULAR TRACK AT CASTLE POINT AND THE GRAVITY RAILROAD (A—B)

Among the members were William Ferrand, Gerard Ralston, Richard Peters, Jr., and others. It was to Peters that the colonel, on being invited to join the society, first wrote:

Hoboken, Dec. 28th, 1824

. . . I will explain my meaning when I signified that my subscription to your society would be conditional.

You already know that last March a year ago an Act passed your legislature to incorporate a railroad. Unfortunately, a majority of the gentlemen named as directors proved so lukewarm in the business that they neglected to perform certain duties required of them. . . . In consequence, no choice of directors on the second Tuesday in December took place. . . .

I enclose a supplementary Act for appointing a new set of directors [who] have all expressed their willingness to serve. Whenever said supplement becomes a law, I hereby promise to pay instantly, into the treasury of your Society, $100. Should the object of the charter be carried into effect, out of any surplus after paying the dividend of three per cent quarterly, I agree to pay into said treasury $100. Lastly, on an assurance from the Society that it is disposed to exert its influence in procuring the passage of the Act, I promise to explain to you the method by which I expect to remove . . . the difficulties which appear so formidable.

The society did coöperate. In the following spring it sent William Strickland to England specifically to investigate railroads, and read with interest his subsequent report recommending them for rolling country, while canals were retained for levels. This sympathetic attitude toward his plans made the colonel an active member of the society and resulted in his urging Gerard Ralston—now its corresponding secretary—to be "in constant attendance at the session of the legislature at Harrisburg." In return, the colonel proposed to secure for Ralston an executive position when

the road should be finished. "There can be no question," he declared, "that, should it be completed, it will soon be not only extended to Pittsburg but ramified in all directions." By this he definitely meant to include his New Jersey section, long authorized but never begun. "The citizens of New York," said he, "are more deeply interested than, at first blush, they may be aware of. The improvement, once introduced, will unquestionably be extended across New Jersey to the City of New York." Given half a chance, he would then and there have forged the chain now represented by the Pennsylvania main line between New York and Pittsburgh. And that he had no idea of stopping there is shown by another letter to De Witt Clinton, giving all the old arguments and a few fresh ones:

> Rail Roads are . . . most particularly adapted to the conveyance of passengers. . . . As respects the application of power, a Steam Carriage has infinitely the advantage of a Steam Boat. The one operates in a dense medium; the other passes through a medium 900 times more rare. . . .
>
> The object I wish to accomplish is to take passengers from New York to Albany. Do not be startled at the novelty of the idea. All that is required is a level road and the due application of power. . . . The shores of the Hudson afford a theatre for the display of the one, as complete as may be desired; I feel the utmost confidence in being able to effect the latter. . . .
>
> It may be objected that the expense of erecting a railroad 150 miles long will prove too enormously great; that the receipts would not, after deducting expenses, pay legal interest on the capital invested. . . . A rail road executed on my plan would cost only $5,000 per mile. . . .
>
> Although I failed, some dozen years ago, to convince you that rail-roads with steam carriages were preferable to canal navigation, in the present instance I trust I shall be more fortunate and that you will unhesitatingly give a decided

preference to Steam Carriages—especially for the conveyance of passengers.

Clinton's prompt reply showed that the colonel had asked what was still rather too much for the governor to grasp:

Albany, 24 January.

I have just received your interesting letter relative to steam carriages . . . and am fully impressed with the importance of the project. . . .

You say that the application of steam power for effecting this object has not yet been accomplished; but I have no doubt but that you are aware that it is about to be tried in England. I enclose a piece cut out of a late London paper, to that effect. If this experiment succeeds in that country, I presume it will soon be transferred to us and that there will then be no great difficulty in realising your views.

Until your plan can be tested by actual experiment, on a small scale at least, I think it will be almost impracticable to procure an adequate investment of capital on the magnificent scale you have contemplated.

It is an odd fact that the governor has for years been a part of the tradition of the New York Central, and actually had a particular train called by his name. As yet it does not appear that the man who planted the whole idea of railroads in Clinton's mind has been similarly honored by a "John Stevens Special."

Clinton's letter could not blot out the colonel's vision of a railroad along the Hudson. Lest the expense of a "double line" should seem "too magnificent" and frighten capital, he at first advocated only a single track, with the same "turnouts" he had proposed in 1812 and with schedules carefully made to prevent interference between "suites of carriages." He did not propose to produce, at once, a Twentieth Century Limited; he did expect to demonstrate that "more

than four miles an hour" was entirely practicable. And it had suddenly come upon him that his years were passing.

"It is really surprising," wrote Rachel to Richard, "that Your Papa at his age should be so very active; as much so as ten years ago. He enjoys good health and his faculties don't seem in the least impaired." It was quite true, but he could not deny the inexorable calendar that made him seventy-six. He could wait no longer for time.

> Within [he announced] one month after the specific number of shares have been subscribed, J. S. engages to erect a railway at Hoboken of sufficient extent to test the merits, on which will be placed a number of carriages to be propelled by steam, moving alternately forwards and backwards, with a celerity far exceeding that of carriages on the . . . turnpikes.

In after years, John Cox always declared that his father had built his first steam carriage in 1795, abandoning it for the moment because it proved "cumbersome." Be that as it may, he began to good purpose in 1825, by laying out a circular track on the lower lawn at Hoboken, scene of so many experiments. Since the model of the steam carriage he erected is still in the Smithsonian, it seems proper to quote its official description as given by Mr. Carl Mitman, the distinguished curator of mechanical technology:

> The locomotive consists of a four-wheel platform truck upon which is mounted a vertical tubular boiler inclosed in a circular sheet-iron casing terminating in a conical hood that holds the furnace-door, and upon the hood rests the smoke-stack. The furnace and its grate are circular and are placed inside of the circle formed by the boiler tubes and thus are inclosed by them. The grate rests on the projecting ledge of the lower part of the boiler. A single horizontal cylinder with valve chest on top is situated alongside the boiler and transmits its power to a crank shaft on which is mounted a gear wheel. This gear

engages a second and larger gear vertically beneath it, which in turn meshes into a rack rail situated midway between the rails and about on a level with them. Four vertical posts extending downward from the floor of the truck near each corner and terminating in rollers in contact with the inner surface of the rails, guide the truck on the track.

On February 28, 1825, the colonel made a private memorandum.

In the afternoon of last Saturday week, I made some experiments for propelling a carriage on railways but did not succeed to my satisfaction owing to the great friction of the wheels against the sides. On the following Monday I sent the carriage down to Van Velsen's shop and directed him to insert rollers into each end of two bars; one to be placed in front of the fore-wheels and the other behind the hind wheels, extending beyond their track on each side, so as to roll against the upright pieces placed on the outer sides of the ways [tracks]. This improvement, as far as I know, is original.

In the model this addition is not shown. Unfortunately, too, in the effort to give detail, the photographs are a little confusing in that they show the tubular boiler *outside* its casing. Otherwise, the colonel's correspondence substantiates the model as representing his effort to make good his own words: "Rail Roads have nowhere yet been made, on this side the Atlantic. Let the experiment be fairly tried." Believing firmly in "ocular demonstration," he showed his steam carriage to every guest at the villa—not as a toy but as a sample of what he proposed using on his Pennsylvania Railroad. Gentlemen must cram their beavers a bit tighter on their heads; ladies must gather their wide skirts about them and clutch the handles of their tiny parasols. At the appalling speed of six miles an hour, one and all must try the first American steam railroad.

Next season, the "Commercial Advertiser" described "the circle at the Hoboken Hotel":

> The curve of this article is very rank, much more so than can be possibly required in pursuing the route of a road. This great deviation from a straight line gives rise to an enormous friction, the greater part of which, however, Mr S. has contrived to obviate.
>
> His engine and carriage weigh less than a ton, whereas those now in use in England weigh from eight to ten tons. His original intention was to give the carriage a motion of sixteen to twenty miles an hour, but he has deemed it more prudent to move, in the first instances, with a moderate velocity, and has accordingly altered the gearing, which renders it impracticable to move fast.

Richard, from Paris, had sent home a detailed description of the Montagnes Russes—the aerial railways so called because they were first introduced in St. Petersburg and Moscow.

> I have endeavored to collect all the information in my power. . . . There are two gardens that have them; the Tivoli, handsomest and most fashionable, and the Grande Chaumiere. But the most elegant was at Beaujou—just demolished. . . . The elevation of this was about 80 feet. . . . I recollect riding down it—the velocity was tremendous. . . . The carriages were made to hold two persons; they resemble our sleighs in their shape. . . .
>
> The most curious and, it seems to me, most expensive part . . . is the machinery to draw up the carriage. An iron chain extends from the bottom to the upper platform on which you start. It runs on small wheels . . . [with] an axis for two horses about 9 or 10 feet asunder. . . . There is not the least danger, I think . . . if well made . . . and cannot imagine how an accident can happen. . . .
>
> There's a band of stuffed leather . . . which goes across the person's breast when he is seated. . . .

The best place at Hoboken would be on our hill. . . . Wherever it is erected, there ought to be an establishment for refreshments. If Pa would consent to rent our house, you might have . . . a sort of Vauxhall Garden, for which you might fix a price of entry. I don't know how they would take with our folks; they are great favorites here. . . . Perhaps it was the novelty of the motion and perhaps on this account as much as the rapidity of motion, it has been recommended by physicians to invalids and convalescents. . . . There is something extremely pleasurable in rapid motion—hence Johnson said the greatest sensual enjoyment he knew was the rapid whirl of a stage-coach. . . .

At the Grande Chaumiere they have hobby-horses placed on wheels, which have a good effect in descending. . . . At the bottom is a pile of sand which stops the carriages immediately. . . . I could not obtain all the information on account of the surliness of the proprietors. I was about to measure a pavillion with a string, when the proprietor came at me in a furious rage; we had a high quarrel to the amusement of the spectators. . . .

No doubt it would succeed at Hoboken. It would be very pleasant to sit on the green and watch the cars descend. I think Rob might let his house in connection with it. . . . Should you put up one, it strikes me you better subscribe to every paper in the city, or else some crabbed editor might . . . write you down.

Partly to inspect these "mountains" and partly because Richard had been very ill, the colonel was planning a flying trip to Paris. Since his friends Ralston and Peters, with other members of their society, were pushing the railroad bills at Harrisburg, and since personal affairs were more tranquil, the moment seemed propitious. Mary Stevens had some months before been happily married to another naval officer, Joshua R. Sands, and was expecting to go with him to duty at Portsmouth. Edwin, although he had moved to Philadelphia to manage that end of the line of transporta-

tion, could be relied upon to come back and meet any emergency. But Rachel's letter to Richard explains why this plan fell through.

> . . . Your Papa has given up all idea of going to France, and . . . you may therefore make your arrangements to come home as soon as you please. . . . I wrote you the distressing intelligence of your dear sister Mary's death, the sixth of last month, leaving a lovely boy two weeks old. Mr Sands is now here, the very picture of woe.

Writing to Ralston, the colonel gave Mary's death as a reason for temporarily suspending his own activities, but at the same time urged no slackening of the effort to get the supplementary act through the legislature. He was glad that advance reports from Strickland had induced the governor to recommend "weighing the relative merits of railways and canals," and was convinced the publication of the full report would bring conviction to all concerned. He proposed shortly to resume "making a model of a plan for ascending and descending inclined planes without recurrence to stationary engines," and continued:

> Should even my projected improvements all come to nothing (Do not construe this as the language of despair—far from it!) enough has already been done in England to place this grand improvement beyond all possibility of failure. The establishment of railroads will form an entirely new Era in Political Economy. . . . I entreat you to be up and doing!

In reply, Ralston deplored the attitude of Pennsylvania's newly appointed Canal Commissioners, whom he described as opposed to all discussion of railways on the ground that this "would distract public attention and so defeat *all* species of improvement." However, said he, "*now* is the time to push this affair; if the present winter passes without action, in-

numerable difficulties will arise." Since the colonel had left the nomination of new directors largely to Ralston and his associates, they had chosen, "in place of Messrs. Girard, Connelly, and Carey, Gen'l Thomas Cadwalder, Mr. C. I. Ingersoll, and Wm. McIlvaine."

William Lehman of the Pennsylvania legislature wrote that he had held "conversations with other members" and, in consequence of these, thought it would be "impossible to have anything done this session, because we shall probably adjourn early in April." Lehman was mistaken. The bill did pass, on April 27, 1826. To make its effect broader, it retained all the objects of the first bill, but repealed the special concessions to John Stevens; a change approved by him as likely to interest more men. Strickland and Major Wilson were engaged to check the survey from Philadelphia to Columbia by the colonel and to make exact estimates of cost. It would be two years before the legislature would find public opinion so altered as to force an appropriation of $2,000,000—the first known state contribution to railroad building. April, 1828, would mark the beginning of the new survey, which, by July, would reach "the farm of Colonel Baker, 20 miles from Columbia" and on the line of actual construction in 1829.

Since the original purpose of reaching Pittsburgh, proposed by the colonel, was not abandoned but finally accomplished, and since, through all subsequent acts and charters, the name he suggested—Pennsylvania Railroad—was retained, there need scarcely be any question as to the oldest commercial railroad in America. This one dates from March 31, 1823, or—if its New Jersey portion, as seems proper, be included—from February 6, 1815. By way of interesting comparison, Mr. Samuel Hardin Church has fixed the birthdays of other roads. The Mohawk & Hudson, April 17,

1826; Baltimore & Ohio, February 28, 1827; South Carolina Canal & Railroad, December 27, 1827; part of the present Lackawanna, January 28, 1828, and so on. In the kind of country they cross, in their length, and in the character of their service these roads differ greatly; but they and all others have one significant feature in common. They grew out of the efforts of one man with his conception of "ramifications in all directions." Taking New York's first road as a single example, we find Stephen Van Rensselaer, in February, 1826, submitting a petition for a line from Albany to Schenectady. It had taken him some time to digest the colonel's earlier letters, but he immediately received another, congratulating him upon his action and urging an extension to New York. A few days later the colonel again wrote to Clinton, citing what had been accomplished at Hutton, England, repeating his earlier arguments, and making the additional suggestion of "four lines; two for the conveyance of passengers and two for the transport of goods." Thus, when Clinton made to the legislature those recommendations which eventually resulted in the Mohawk & Hudson, he had—or could have had—in his pocket the colonel's latest effort to overcome his (Clinton's) earlier coolness to the great vision.

In that vision John Stevens never faltered. To beat down opposition he spoke and wrote volumes, piling the Ossa of fast passenger service upon the Pelion of markets for the farmer, and supporting the whole by "legal interest on the capital." If he left anything unsaid on paper he presented this in a picture—his little "ocular demonstration" at Hoboken.

CHAPTER TWENTY-ONE

On Saturday afternoon, a large number of gentlemen assembled, by particular invitation of the proprietors, on board the new steamboat Burlington and, between 5 and 6 o'clock, a short excursion down the river was commenced.

We have already referred to the accommodations of this truly elegant boat; it is proper to add that the whole extent of her deck presents a beautiful promenade, her cabins are high in the ceiling and richly furnished, and we were especially gratified with the quantity of room allowed to the ladies' cabin, as well as the richness and comforts of its furniture and arrangements.

About half past 6 o'clock, the company were invited down into the after-cabin, to partake of the provisions of a table which the hospitable proprietors had caused to be furnished with great taste and extreme liberality. After the more substantial matters had been discussed, the resort to the wine was made, with the following toast offered by Richard Peters, jr, Esq and received with great cordiality:

"John Stevens, Esq, of Hoboken; Philadelphia owes to him and to the science and liberality of his family, the best application of steam."

Mr Stevens subsequently gave the following:

"The citizens of Philadelphia; those who have tasted their hospitality can never forget it."

In the enjoyment of the provisions of the table, or conversation upon deck, the company was conveyed to the Red Bank, thence up the river, beyond the city and, returning, were in due season landed at Chestnut Street wharf, highly gratified with their excursion and wishing complete success to the "Burlington" and her enterprising proprietors.

A New York newspaper, quoting these paragraphs from one of its Philadelphia contemporaries, said: "We may add

to this testimonial to the enterprise of Mr. Stevens and his family, that New York also owes to them the most successful application of steam." The colonel had never had a greater public tribute, but he insisted that most of the progress of the last few years was due to "the boys." After adding the *Fairy Queen* to the Hoboken ferries and thus, in 1825, making an end to the clumsy horse-boats, they had bought most of their father's stock on the Delaware. Allied with the New Brunswick operators, they had "a connected and entire line of Steam Boats and Stages, to and from, and between, the cities of New York and Philadelphia." The running of that line was described by Captain Basil Hall, R.N., in "Travels in North America, 1827":

> The beautiful and commodious steamboats go as far as they can up the Raritan River. The passengers then disembark, to be carried in stages across a neck of land until they reach the Delaware; thence speedily transported down the stream to the goodly city of Philadelphia.
>
> In spite of the doctrines of liberty, there are really many distinctions in rank on these boats. Steerage passengers leave the quarterdeck free to ladies or to those who pay more for the honour and glory of the principal accommodations. When the vessel stops, a dozen or two stage-coaches and carriages dash down to the wharf. Each carries ten passengers. Indescribable confusion would result, except for the system followed: The captain goes about among the passengers and picks out those whom he thinks should journey together. Then he gives them the number of a certain coach, and their baggage is marked with the same number. By thus sorting out the sheep from the goats, peace is preserved.

Thus the boys were, in a sense, their father's competitors. While he was working for a network of railroads, they continued to improve the coach service. None but the best horses—and the fastest—would suit them, for at heart they

were all racing men. They were always submitting petitions for legislation authorizing Jersey racing, and their sisters' letters are full of such bits as "*Eclipse*, to the astonishment and dismay of the Southerners, not only beat but distanced *Lady Lightfoot*. James was delighted because he won $16, but Edwin was blue—he lost 8." "Eclipse" was the horse who afterward beat that other great one from the South, "Henry," by a nose, in a grand match for $20,000. This race was the outcome of heavy private betting at a banquet of sportsmen before the meet at the Union Course, Long Island. One account says that "so certain were the Messrs. Stevens of victory that, after their purses were exhausted, they took their watches from their pockets and diamond breast-pins from the bosoms, and bet them on the result." Certainly the sectional feeling ran so high that it could only be cooled by allowing John Cox and some of the Livingstons to buy the winner for $10,000 and the loser for $3,000. Editorials ran the race over again, offered "Eclipse against the world," and applauded the public-spirited citizens who had decided to let "the two finest horses in this and probably any other country" stand at stud in the Hoboken stables. At a moderate cost, the farmers would have this wonderful opportunity to improve their stock; all honor to the men who made this possible. Hurrah for "Eclipse," who ran "at the rate of over 14 yards a second." And Rachel often wrote in the same strain to Richard.

The old set continue their daily visits to the Green & amuse themselves with talking and looking at their racehorses—Hosack, Walter Van Dunscom, & Stephen, all as happy as lords.

There has been great racing last week, on Long Island. The favorite, *Count Piper*, owned by Walter, your brother John,

& Dr Hosack, won the grand match with ease, beating the southern horse *Vanity*. So sure were the southerners of winning that they bet two or three to one against *Piper*.

The colonel fully sympathized. Many of his letters were written to support his sons' arguments for changing the racing laws, and his membership in the Agricultural Society of Bergen county was mainly due to his interest in improving the breed of horses used in the coaches. Speed was his hobby; he looked for it in man, beast, or machine, and kept records of the performances of all three which were the primer prototypes of John Cox's celebrated racing- and stud-books.

Robert could afford to carry his share of the racing-stable, for he was by now the most prosperous of the brothers. He had built a cupola furnace at Hoboken and so added to the shops there that he was able to do other men's work as well as his own. Moreover, his inventions and improvements had made of him a consulting engineer, to whom other men, for criticism and suggestion, submitted their plans. William Burke's letter is typical:

> I took the liberty of calling upon you, as a stranger, for . . . your opinion upon a mechanical idea, . . . with the feeling that the opinion of the man who has done more than any other in bringing Steam propulsion to its present state of perfection, would be decisive. . . . I was unwilling to hazard expense; but, as you felt too delicate to examine my project until it was caveated, I determined to remove that obstacle for the sake of the opinion.

Thus Robert could find most of the money for the *New Philadelphia*, designed expressly for the Hudson service. On August 24, 1826, she beat all previous records by making the Albany run in twelve hours twenty-three minutes—

a performance not beaten for the next six years. In general very like the *Trenton*, her trials were so satisfactory as to warrant advertising her two days after they were completed.

The low-pressure steamboat "New Philadelphia" will commence her regular trips on Tuesday the 29th. She will leave the dock, foot of Courtlandt Street, formerly occupied by the North River Company, on Tuesdays, Thursdays, and Saturdays; and Albany on Mondays, Wednesdays, and Fridays. She will land and receive passengers at the usual landings.

From the strength of the boat and the construction of her machinery, there is little or no jar in any part. Her cabins are light, airy, and spacious, elegantly fitted up with mahogany, maple, and marble. Her dining room is 44 x 22 and decorated with a variety of paintings.

It is expected from the trip lately made that her passages, from a difference in wind and tides, may vary from 10 to 14 hours; so that, at this season of the year, passengers may calculate on being landed at Albany before dark!

As usual with him, Robert had hardly finished the *New Philadelphia* before he began to improve her by installing his balanced poppet-valves which made it possible for one man to operate her engines. Upon her, too, he made many experiments in fitting false bows to give her finer lines. The story goes that Bell & Brown, the shipbuilders, refused to do this work for him, on the ground that she would look ridiculous and make men speak derisively of "Bell's Nose." At Hoboken, therefore, Robert himself did the work—an addition built up from the keel to about two feet above the water and carried well aft, then decked over and calked. It gave her an easier "entrance" and so added to her speed. As Scott Russell puts it, "the old plough was little better than a clod-crusher and the old ship little better than a water-bruiser. Then came an improvement in ploughs; they were drawn out in front to a thin, fine, edge; they were

carefully smoothed into wedges—not straight, but with a fine, hollow curve that first parted the earth, then raised it obliquely and gently laid it on one side; a revolution in agriculture." This was the theory that Robert applied afloat, to find himself soon followed by other naval constructors. Indeed, Russell's figure is particularly well chosen, for the reason that one of the less-known devices properly to be credited to the Stevens brothers—though to them little more than a by-product—was the Stevens improved plow. In the main, this appears to have been due to Edwin, who occasionally looked up from the family funds and affairs to visualize an invention by way of mental relaxation. On another occasion, having noted the slowness with which New York city's refuse was handled, he took time enough from his ordinary business to design a body with removable sides for what was afterward commonly used as the "two-horse dump wagon."

Professor Renwick measured the revolutions of the *New Philadelphia's* wheels at twenty-five and a one half a minute, with a piston velocity of 405 feet in the same time. This was slightly faster than in Robert's next craft, the *North America*, equipped with a pair of beam-engines. But the new vessel was lighter and built on lines evolved from the last experiments. She made as much as fifteen miles an hour on the Hudson, this "phenomenal" speed resulting from the use of forced draft. Here again Edwin had a hand in designing what has since been commonly adopted as the "closed fire-room" system, that one in which the air, under pressure from the blowers, can escape in only one way—through the boiler ash-pit and the fire on the grate. Still another feature of the *North America* was the first introduction of the stiffening trusses and timbers which her lightness and speed made necessary to prevent bending or "hogging."

This appears to have been entirely Robert's plan, promptly adopted by later builders.

These two were the first in a long succession of Stevens craft on the Hudson. They recaptured for the colonel his long-lost "playground" and connected him at last with his cherished goal—the Overslaugh at Albany. They had to make speed, because open competition and the passing years brought a host of rivals like "Uncle Daniel" Drew, Isaac Newton, and the other owners and skippers to fight that picturesque, no-quarter battle for the dock-to-dock record and the cream of the business.

The colonel watched the early skirmishes from ashore. He was absorbed in his railroad experiments and thrilled by the sound, here and there throughout the country, of inspired shovels. On the other hand, he was disappointed over the slowness of Hoboken's development, particularly because some of his family displayed an astonishing and unfortunate lack of faith in Edwin as trustee for the whole estate. As one way out, he proposed to sell the whole waterfront to the corporation of New York, arguing that "the advantages derivable from such a purchase, as a pecuniary speculation," were incalculable. Moreover, he said, even these would be small beside "the vast importance of such a place of general resort for citizens, as well as strangers, for health and recreation. So easily accessible, and where in a few minutes the dust, noise, and bad smells of the city may be exchanged for the pure air, delightful shades, and completely rural scenery—with walks along the margin of the Hudson to the extent of a mile." As was his way, he tried to make his prospectus cover every point.

. . . To obviate all objections arising from the present inability of the corporation to advance the capital requisite for the purchase . . . and improvements, two gentlemen of un-

doubted credit [David Hosack and John Jacob Astor] to their immortal honor, offer to step forward and make such arrangements as will completely relieve the corporation from all difficulties . . . on that score. . . . And the present proprietor will superintend, gratis, all operations for carrying . . . improvements into effect. . . .

For affording accommodation and refreshment, and adequate protection against sudden showers, pavilions should be erected . . . in eligible sites. . . . These should be . . . under immediate control . . . and the occupants restricted from selling . . . intoxicating liquors. . . . Every effort should be resorted to, to make these [pavilions] the most finished specimens of architecture and elegance. . . . For the attainment of this . . . emulation should be excited by conferring adequate premiums on such plans offered as may be most approved . . . by competent judges. . . . Let this not be condemned as . . . unnecessary extravagance. . . . Nothing could have a more powerful tendency to civilize the . . . mass of society—to polish and refine the manners—than the mixed intercourse . . . in such promiscuous assemblages of the rich and poor, in situations where art and nature are made to contribute so largely to . . . every scene. . . . As aiding and promoting such beneficial results, the Board of Aldermen would have frequent occasion of holding meetings in some one of these pavilions.

He thought the existing ferry charge exorbitant. To cross the ferry twice a day cost the commuter of 1824 no less than $91.25 a year, without any luggage. It was plain, said the colonel, that this "would never answer for those who depend upon doing business daily in New York," and he suggested cutting this cost to $10 a year. Such a low rate, however, would be possible only if building on a large scale were undertaken—as he proposed it, two thousand small houses costing $800 to build and renting for $75 a year. This he thought "all that was wanting to give Hoboken a decided preference." The basis of his idea for raising the

building fund was the sending of Edwin to Europe to negotiate a loan on the estate.

Development on this broad plan did not come during the colonel's lifetime; but his object, and the progress he made toward it, are well expressed in an extract from the Fanny Kemble [Butler] diary for 1832:

> It is now two years since I visited Hoboken for the first time—it is more beautiful than ever. The good taste of the proprietor has made it one of the most picturesque and delightful places imaginable; it wants but a good carriage-drive along the water's edge—for which the ground lies very favorably—to make it as perfect a public promenade as any European city can boast, with the advantage of such a river, for its principal object, as none of them possess.
>
> I think the European traveller, in order to form a just estimate both of the evils and advantages deriving from the institutions of this country, should spend one day on the streets of New York and the next in the walks of Hoboken. If in the one, the toil, the care, the labour of mind and body —the outward and visible signs of the debasing pursuit of wealth—are marked in melancholy characters upon every man he meets, and bear witness to the great curse of the country, in the other, the crowds of happy, cheerful, enjoying beings of that order which, in the old world, are condemned to ceaseless and unrequited labour, will testify to the blessings that counter-balance that curse. I never was so forcibly struck with the prosperity and happiness of the lower orders of society as yesterday, returning from Hoboken.
>
> We rode, like very impudent persons, up to the house on the height. The house itself is too unsheltered for comfort either in summer or in winter; but the view from its site is beautiful, and we had it in perfection.

Very little of Hoboken to-day can be recognized in that description. However, it has become the great steamship and railroad terminus that the colonel hoped to make it—and

from his hilltop the view is still there. His descendants, too, have made an effort to realize this one of his many dreams. Following the plan of his proposed incorporation, they pooled much of their ultimate inheritance into a land and improvement company, with Robert and Edwin at the head of it. Through succeeding generations, in a life now nearly as long as the colonel's own, it has been possible for this company to play a leading part in underwriting schools, churches, and playgrounds, besides many forms of public service; an accomplishment which would doubtless have consoled the colonel for the blotting-out, by commercialism, of his green lawns and tall shade trees.

Another attempt of his to popularize Hoboken as a resort appears in a New York paper:

It will be seen by our advertising columns that a medal to the value of $50 will be awarded as a premium for the best Oration, to be delivered at the approaching anniversary of our Independence, on the beautiful lawn in front of the Hotel at Hoboken. If local scenery has any effect in elevating the mind and inspiring generous sentiments, we know of no place better calculated to draw forth bursts of eloquence than the rural retreat at Hoboken, commanding a view of one of the noblest rivers and bays in the world, covered with the foreign and inland commerce of the young Republic—with a proud city lifting its hundred spires on one hand, and the variegated charms of nature on the other.

Nor is the Jersey shore, looking downward to Staten Island and upward to the ruined fortresses on the banks of the Hudson, wanting in Revolutionary associations. If a citizen can ramble on a bright afternoon, along the banks of the "Noble North," through the shades of Hoboken, without feeling eloquent, poetical, and patriotic, let him be assured that he is unfit to enter the list of competitors for the Medal. The successful candidate may be certain of attracting a numerous audience, not to be wedged within the walls of a church, but seated upon the green turf in the great Temple of Nature.

The medal in question was awarded to a young New York lawyer named Jackson, whose flow of oratory so pleased the colonel that he later engaged Jackson as counsel and thus started him upon a very successful future in railroading.

Turning back to his plans for steam carriages, the colonel submitted these to Professor Renwick at Columbia University. Renwick found them "philosophical, primary and elementary, working to such advantage as to leave little doubt" of their practical use. He was particularly struck by the application of the principle of using "a less portion of the moving power for a given effort than any other steam engine yet seen." Admitting that much depended upon "the skill with which they were brought into actual service," he declared that assurance of this was to be found in the "great mechanical skill and ingenuity" of the designer. As to the colonel's additional plan of using a similar device to pull canal boats through locks "partially clogged with ice," Renwick, not having "had leisure to enquire fully," could only say that it appeared "extremely plausible."

Encouraged by Renwick's faith, the colonel proceeded to study Richard's long descriptions of the Montagnes Russes. The feature that particularly impressed him was this: "The good citizens of Petersburgh take great delight in descending from the summits of these artificial mountains of ice with incredible velocity; but, like the boys formerly on Flattenbarrack Hill, they are under the necessity of spending much time and labor to haul their sleds up again." He and Robert put their heads together and on the last day of 1828 issued an advertisement:

ROUND IRON WAYS

An exhibition will take place respecting these Ways on the green near the Mansion House of Mr Stevens, tomorrow, of a

nature entirely new. A carriage will be impelled through the Air, instead of on the Ground, with a rapidity far exceeding any Land Carriage.

The "Aerial Ways" were iron rods, stretching for about four hundred feet between "a firm erection" ten feet high and another one forty feet high, "in the manner of a wire bridge." Over these, a carriage on four wheels ran back and fourth. "As an amusement," said the "Advertiser," "it will be seen that the rapidity of motion may be regulated . . . according to the timidity or fearlessness of those who ride"—but the colonel had another view of its possibilities. He explained them to Nathaniel Carter, editor of the "Statesman":

Hoboken, January 25, 1829

You remained so short a time on the ground last evening that I doubt whether you obtained a clear idea in what manner the motion was given to the carriage, sufficient, after striking against the springs, to return it . . . to the place it started from. This is effected by means of a weight which gives the carriage an impulse at starting. Two men at a windlass raise the weight by the time the carriage returns, so as to keep up . . . constant motion.

The velocity depends on the velocity a heavy body will acquire in falling—say, 32 feet. The weight . . . in falling 16 feet acquires a velocity of 32 feet per second; in . . . 16 more . . . its velocity will be increased to 64 feet. [This] gives 3840 feet per minute . . . equal to 43.63 miles per hour. With such an astonishing velocity, the mail *could be carried from New York to Philadelphia in about two hours.* But . . . as the motion neither begins nor ends with such velocity . . . we will reduce to 30 miles, which would enable us to convey the mail between the two cities in three hours.

As always, the practical possibilities were the attraction for the colonel. In this case, anything to get faster mail

service; in every case, however trivial or even absurd an invention, he stoutly maintained that it might lead to some useful application of power. Thus, in a long discussion of the "Aerial Ways," he suggested how a road might be built over Bergen Hill and thence to Philadelphia. The obvious slowing down of the carriage after each "coast" might be met by building artificial elevations, up which it could be drawn by suitable stationary engines at various points along the line. He explained how, by raising greater weights to greater heights and letting them fall, his Hoboken carriage was "made to jump back and forth a length of more than 700 feet." Might not something similar be applied in practice? Friction and air-resistance must, of course, be overcome; but might not a carriage, with "very little extraneous aid," be given a vibratory motion like a pendulum? If merely raising a weight four or five feet, once in eight days, would make a pendulum—on a scale of six-inch vibrations —travel more than sixteen miles in a day, might not some application of this principle keep the carriages going? Also, in view of Count Rumford's demonstration of the extraordinary strength of properly made hemp cables, why not use this, and suspend the carriage instead of supporting it on rails? On this point he was emphatic:

> It may be said that travelling at so great an elevation through the air would be attended with great danger. To be precipitated from a height of 200 feet would undeniably be followed by fractures and dislocations; in some instances, by death itself. But . . . what are the risks . . . in travelling in a four-horse stage? We place our lives at the mercy of five animals . . . anyone of which, by unruly conduct, may be the means of overturning the carriage.

As the colonel suggested, carriages crossing rivers and deep gorges on cables are nothing unusual to-day. Scenic

STEVENS INSTITUTE OF TECHNOLOGY, CASTLE POINT, HOBOKEN

railways or roller-coasters have spread all over the country from Hoboken. Hence, while nothing came of the colonel's letter to Senator Mahlon Dickerson, suggesting congressional interest and the detailing of men from the corps of engineers to investigate the idea, the fact remains that both entertainment and practical value have resulted from these earliest American Montagnes Russes. Moreover, they bore the germ of another idea which the colonel presently submitted to the corporation of New York:

> Two Rail ways, commencing at the Battery fence . . . should there be elevated about ten or twelve feet above the pavement, so as to admit carriages of every description to pass freely . . . under said rails. . . . The Railway then to be carried on each side of Washington or Greenwich Street, supported on pillars of stone, iron, or wood, placed near the curbstones; extending to some point above the . . . State Prison, . . . and rising gradually from the horizontal to a height of 25 or thirty feet. Thence to proceed at right angles, or . . . nearly [so] to the commencement of a Bridge across the Hudson River, . . . still rising [toward] the shore at Hoboken [where] the elevation will be between 30 & 100 feet. The Railways are then to proceed in a direct line over Bergen Hill to the termination of the canal west of the little Falls of the Passaic.

In addition to carrying "passengers, goods, marketing, etc," the colonel held that his elevated railroad and bridge combination would provide—as he was always hoping to provide—an adequate water supply for the city. Furthermore, said he, here would be the means "of obtaining a never failing supply, not only to the whole city, but to the state as well, of a fuel of superior quality. . . . What is called the Schuylkill coal could be brought into New York markets . . . at one-third of what it now costs." Never content with the mere killing of two birds, the colonel must have

three or four in return for each stone. "After giving due weight," he declared, "to all these circumstances, a bridge across the Hudson, cost what it may, will not be liable to any serious objection. Nay! a million dollars should present no serious obstacle to completion!" For use on such a railroad as he proposed, he brought forward a new design for steam carriages:

> . . . I find the almost universal practice of applying the Steam Engine to the purpose of propelling carriages . . . is by means of the adhesion of the periphery of the wheels to the metal plates the ways are composed of. . . . To preserve the power of traction, and at the same time . . . lessen friction, I purpose constructing carriage-wheels of 8 feet diameter, the tire to be 4 in. wide and one inch thick. Altho' the power of traction will be thus increased, the weight on the axes will continue nearly the same. To give due strength to these wheels, the spokes are purposed to be dished on each side alternately.
>
> The axis to be cranked, attached to each end of a lever beam; connecting rods will be moved by the piston-rods and thus give motion to the beam, the cranks on each side [being] moved by rods connected . . . with the lever beam and thus superseding the necessity of cog-wheels, &c, to give motion to the carriage wheels. . . . I think it will be found better to place the cylinders horizontally, with piston rods passing through stuffing boxes at each end of the cylinder; these rods to be connected after the usual manner with the cranks.

This offers an interesting comparison with modern locomotives. For climbing steep grades, the colonel thought it might still be necessary to use a cog under the carriage, to mesh into a rack between the rails; this rack to be fitted with springs underneath, to insure the teeth "falling into each other at the moment of contact"—a slight modification of the rack used on the Hoboken track.

Many a Jerseyman had ridden in the colonel's demonstrator, and many another had been in the habit of traveling to Philadelphia by the Union Line, when the connection between the two forms of transportation was made startlingly apparent to every one by the triumph of the Stephensons' "Rocket" in 1829. Skeptics, denying that they had ever doubted, began to fade away, leaving room for enthusiasts. The plea for better roads, made so long before by Mr. J. Stevens and endlessly repeated through a century by his descendants, suddenly found a host of listeners. In other States, railroads were already begun, either upon the colonel's plan or upon similar ones, and at least one British locomotive had actually been imported. If railroads were, indeed, the coming thing, why not build a railroad in New Jersey under John Stevens's charter? Or, cried the new-born fanatics, why not get charters of our own?

Petitions came crowding to the table of the legislature, only to meet a similar flood of canal petitions. Many of the unsuccessful competitors of the Union Line found, in this ancient grudge, an excuse for following the canal leaders because the embattled colonel stood at the head of the railroad men. Lobbying became so sharp and bitter that the question whether canals or railroads would win in Jersey had reached a virtual deadlock on a certain night when Robert and John Cox decided to spend an hour or two at the play. In the foyer of the old Park Theater, New York, they came upon Commodore Robert F. Stockton, a leader of the canal party. Whatever play was being presented on that January evening, it must have been utterly forgotten for the debate that immediately began. Out of that discussion came unexpected compromise, and on February 4, 1830, two charters were granted by New Jersey—one to the Delaware

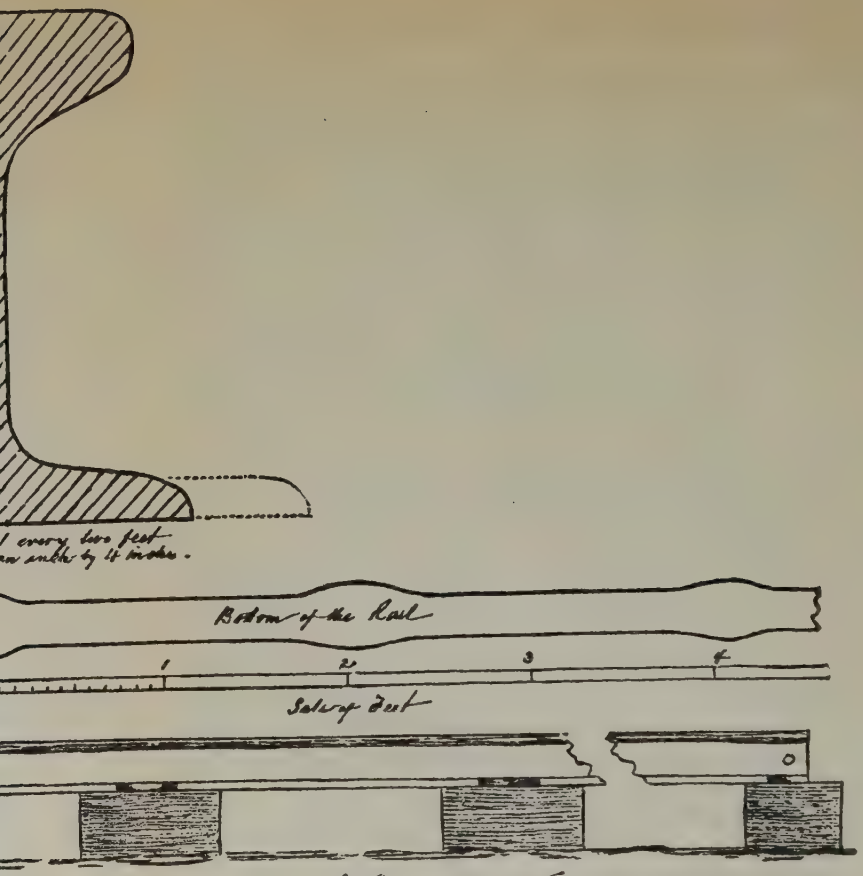
& Raritan Canal Company, the other to the Camden & Amboy Railroad and Transportation Company.

The railroad men met and organized at Camden on April 12. Robert was elected president and chief engineer; Edwin, treasurer; and Jeremiah Sloan, secretary. While active management was thus laid upon the two brothers, they were not to be without the help of their father, who was as keen as ever and had, in that very week, written to President Jackson and taken "the liberty of saying a few words on the subject of railways and steam-carriages":

Hoboken, Ap. 7, 1830

. . . As I have in my former letter observed, time and space will be annihilated. . . . Our external commerce, from various causes, is at present . . . in a somewhat languishing state; but railways would soon revive our wonted vigorous exertions. . . . The vast extent of our territory embraces . . . every variety of soil and climate; of what is usually called the "rough materials" of fabrics we possess an abundance. We want . . . only a facility of transportation to make our internal communications supply . . . any interruption of foreign intercourse. . . . By this means of communication, I should not be surprised should we be able soon to procure abundant supplies of oranges, pine-apples, limes, etc, in one-third the time it now takes, by sea. . . . How transcendantly meritorious will that Administration prove, by whose efforts . . . are accomplished improvements that will bestow blessings on future generations to the end of time.

Without waiting for any possible help from Jackson, Edwin plunged into Jersey politics and finance. Since there were no clear laws upon methods of obtaining franchises or of buying rights of way through private property, these matters would occupy his attention for years. But he found time to organize a staff, securing Major John Wilson and Lieutenant William Cook to make a survey, with Isaac



Liverpool November 26 1830.

rake with your contract to deliver at Liverpool, say from five
hundred, of the best quality Iron rolled to the above pattern in
lengths, to lap as shewn in the drawing, with one hole at each
on the lower flange at every two feet Cash on delivery ..
the first delivery, and at what rate p month until the
should the terms suit and the work give satisfaction a more
to follow, as this is but about one fiftieth part of the quantity
direct your answer (as soon as convenient) to the care of
Consul of the United States at Liverpool ——

I am

Your obedient Servant

Robt L Stevens

President & Engineer of the Camden & South
Amboy Rail Road & Transportation Company

SKETCH OF THE WORLD'S FIRST T-RAIL

Dripps as the road's future master mechanic. Far from being as "unwilling" to help his father as his brother James had once predicted, Edwin was very soon whole-heartedly absorbed in railroads.

Construction naturally fell to Robert's share. He thought an all-iron rail preferable to both the wooden ones and the plated stone "riggers" which had been tried on one or two short American lines. When he met his fellow-directors in October, he persuaded them to let him go to Europe and buy any iron rails he chose, with any other desirable material. On the fifteenth of the month, aboard the *Hibernia*, he sailed with a penknife in his pocket. Picking up a billet of wood left on deck by some careless foremast-hand, he began whittling to pass away the long hours of the voyage. Naturally enough, his fingers turned to the design that just then most interested him—rails. When he had cut a section of the popular British rail—the Birkinshaw—he realized that this would require a special "chair," a costly thing in an America where iron was dear and metal-workers scarce. Looking for something better, he produced, in his final section from that billet, the world's first T-rail—standard for the United States ever since.

On landing, he wrote to a number of English ironmasters, inclosing a sketch and asking for bids; either because of their disapproval or from some other reason, he got none. He had, however, a friend in Mr. Guest (afterward Sir John), the owner of large iron-works in Dowlais, Wales, and with him soon went posting off in a coach. The Dowlais workmen were not afraid of a new idea, but they were in some doubt whether their rolling-mills would stand the strain of realizing it. When Robert had deposited "a handsome sum" to guarantee any damage, Mr. Guest gave the word to go ahead. The mills did break down a number of times, and

the first specimens, as Robert described them in his letters home, came out "twisted and as crooked as snakes," until some one hit upon the right method of straightening them while still hot. Unfortunately, although this Welsh firm is still alive and thriving as Guest, Keen & Nettlefolds, and although its officers were good enough to conduct an exhaustive search of the archives, no original account of this struggle has been found. But of the result there is no doubt, for in May of 1831 the *Charlemagne* brought back to Philadelphia the first shipment—550 rails. They ran to sixteen feet in length, three and a half inches high, two and an eighth wide on the head and three and a half at the base. They were originally designed to weigh thirty-six pounds to the yard, but this was almost immediately raised to about forty-two and has since been much further increased. But for this and a small change in the curve of the fillets, any one might walk out upon the nearest railroad and—given a sufficiently good hacksaw—cut himself a section of Robert's T-rail. Those that he actually laid were long afterward described as "still in use and of such superior quality that, after they are worn out, the company's mechanics prefer them to new iron in making repairs." The type has sometimes been called the Vignolles rail, but the cause of this misnomer is readily explained by a letter written to Robert by Francis B. Ogden, then American consul in Liverpool:

July 16, 1831

. . . Vignolles has laid down his road in that way, the rails remarkably well executed on your pattern, like the piece I sent out to you but much lighter, and [he] is very much pleased with it and says it is decidedly the best rail in use.

Not long after Robert had sailed for England, Edwin reported, in one of the few letters of his still in existence, the progress being made at home:

Nov. 30, 1830

I hope, ere this, you are safely landed. We are all well at home and things go on as usual. The *Philadelphia* continues to beat the *Ohio* from 30 to 45 minutes and does pretty well. The morning Boats, not so well and the Union Line not so well as it has done. The opposition to N. Brunswick is not yet on nor do I believe it will come on this fall or winter.

There was no Race at the Union barn; Colden was not able to put up the purses. The Poughkeepsie Club had a second meeting and the horses from the Island all went up. [Your] *Black Maria* took the first day easily, beating *Leopold*, Parker's Horse, and 3 or 4 others. The second day was taken by one of Parker's Horses (*Corporal Trim*, I believe) beating your mare and 3 others. Alfred says the mare would have had a good chance for the money if she had not run away with the Boy and busted herself out with *May Day*.

Cook has not yet compleated the Survey but expects to, in 10 days. We have commenced with the deep cut. . . . I shall put two gangs on the North side and one on the South side of the Hill; also one at the Hill this side of Brown's Tavern. A small gang is at work at Camden. I am in hopes, in a month's time, to have most of the line from Amboy to Bord[entown] let out to the lowest bidder. The lowest offer for Blocks of stone—18 in. square, 10 to 13 deep—at this end is 44½ cts; at the other end 34 cts. Granate rail 12 in. square, not less than 5 feet long, 37 cts per foot, drilled ready to put the iron on.

I have allowed, for transportation, one team to take one ton ten miles a day for $1.50 or 15 cts per mile. The average distance 3 1/3 miles equal 50 cts per ton. After the road was laid 6 2/3 miles it would be cheaper or as cheap as the railway could be used.

In looking over the report of the Liverpool and Manchester Road I find that an engine is estimated to draw 30 tons 15 miles an hour on a level and 7 tons up an inclined plane of 1 to 100 at the same speed. Or, 45 tons on the level and 12 tons up the plane at 10 miles per hour. The adhesion of the wheels of a 4½ ton engine being sufficient to draw 45 tons on a level, with slipping; up an inclined plane of 35 feet in a

mile the same engine will take 16¾ tons without slipping. Now, if we could increase the friction on the inclined planes by making the iron . . . rail broader and softer, perhaps we could take up as much on the inclined plane of 52 feet at a slower speed, without the wheels slipping, as we could do up the 35-foot planes with the common rails. The slipping of the wheels is going to be a serious difficulty. . . . I think it will be best to take down all . . . hills, except the first, to 35 per mile.

If you ship any iron, ship in the name of the Company, [or] you may lose the benefit of the discriminating duty.

We have had another fight with the legislature. The Delaware & Raritan Canal Co has applyed for an extension of their charter, with the priviledge of putting a Rail Road on its banks. Their bill—as also the Sea Serpents'—is engrossed but I think neither stands any chance of passing. We offered $20,000 a year and 20 cts per passenger, or 1/5 part of our dividends to the state, provided they would not authorize any other road; or, if they did, the Tax was to raise. We will, at the next session, try to get the state to take the 1/4 part of the stock.

E. A. S.

Robert, in England, had soon established very friendly relations with the Stephensons. He was present when their new locomotive, the "Planet," was given its first public trial in December, 1830. As a result of this trial and of conversations with Robert Stephenson, he ordered a similar engine shipped, as soon as possible, to America. For two men whose names were so curiously similar, and whose ideals were so nearly identical, the making of a binding agreement was merely a matter of jotting down a few notes on a half sheet of paper.

Mr Stevens' Engine
Liverpool Railway Office Dec. 6th, 1830

Jones's Wheels if not found objectionable and 4 ft. 6 in. in diameter and wholly wrought iron.

The Boiler 2 ft 6 in. in diameter and 6 ft long. The fire

box a vertical cylinder of as great a diameter as convenient. The Plate in the smoke box to be as light as practicable. The cylinders 9 inches diameter and 20 inch stroke, not more than 3/8 thick. The passages to 6 x 1 1/8. The exhausting port to be larger and to have a chamber close to the cylinder with a large pipe to free the piston from any pressure—say, 4 in. in diameter. The piston rods to be partly steeled and 1 3/8 diameter. The back covers to the cylinders to be of boiler plate.

The joints in the working gear to have straps and keys, and the pin of the eye to be forged in. The guides to be of steel instead of pullies. The cranked axles to be 3 1/4 inches. The brasses to have more bearing sideways. The Boiler to be kept as low as possible.

The depth of the fire box to be 3 feet. The top of fire box to be braced up to the dome. The boiler to be scant 1/4 inch thick but the vertical part to be a full 1/4 inch. The chimney to be a good size.

Four wheels to be alike and coupled on the outside. The side rods to be open work if it be found adviseable.

The cylinders placed to work underneath the angle next the cylinder, the same as the large Engine for Inclined Plane. The tubes to be made of iron as thin as possible. This engine to be completed and delivered in time for the March Packet, 1831.

R. Stephenson
Robt. L. Stevens.

N. B. The crease of the wheels to be 1 1/2 in. deep. The Rails are 5 feet from centre to centre and 2 1/4 in. broad. Inside breadth 4 ft 9 3/4 in. To work expansively at 1/2 stroke.

The whole document reads for what it doubtless was—a practically stenographic report of the criticisms exchanged by the two Roberts as they stood beside the "Planet" after her trial. As a contract, it proved entirely satisfactory; before many months had passed, Isaac Dripps, the Bordentown mechanic, would be puzzling his head over the assembling of Engine Number One for the Camden & Amboy

Railroad—the "John Bull" locomotive, by Stephenson & Company. Her first official run would be on November 12, 1831, with a Bordentown whisky-barrel for her tank and her water-piping made from leather supplied by a local shoemaker.

Without doubt, the arrival of the "John Bull" at Philadelphia warmed the colonel's heart. In celebration, he held a midsummer *fête-champêtre* at Hoboken which has fortunately been described in Philip Hone's diary. Two hundred gentlemen assembled to be taken across the river in the *Chief Justice Marshall* and landed near a spot upon the hillside inclosed in flags and spread with tables. The collation included that popular delicacy of the day, turtle soup, with other "refreshments which the taste and liberality of the entertainers taught us to expect." Later, the party was augmented by the New York and New Jersey boat clubs, "in the white jackets and trousers, round chip hats, and checked shirts" which formed their prescribed uniform. "John Stevens," added Mr. Hone, "presided at the feast with spirits as abundant and sparkling as his champagne. The beautiful groves echoed with merriment and good humour, toasts, songs, and laughter." To see what was at last being accomplished in American railroading brightened the colonel's eye and made him, at eighty-two, easily the life of the party.

Before Robert could make any test of the new locomotive, he must build his track. At the outset he used his father's stone-block plan as worked out by Edwin, and laid 1067½ feet of his new rail near Bordentown. This was enough to demonstrate both track and locomotive to the Jersey legislature, who were invited to climb into two specially built cars of the general appearance of three carriage bodies joined together. Legend insists that the lawmakers found

this a most perilous business, but finally gathered enough courage to ride a short distance. No sooner had they emptied the face-to-face seats, however, than their places were rapidly filled by the friends of Robert and Edwin, the first woman passenger being Princess Caroline Murat, exiled niece of the Emperor Napoleon. Among the many who rode that day, none was more interested and excited than Robert's devoted shadow Francis, the young son of James. Already absorbed in engineering studies, Francis was to become his uncle's chief assistant and later a considerable inventor on his own account. It was of his improved steam cut-off that Robert, to whom he had hesitatingly offered it as "something that might be a step forward," exclaimed: "Not might be, Francis. *Is!*" Among his own papers Francis left some record of the early experiments made to determine whether the English locomotive would serve its American purpose.

On those first tests it became evident that the "John Bull," with only four wheels, would be apt to run off the track as she rounded the curves. Robert therefore devised the earliest form of "pilot," an oak frame eight feet by four, pinned together at the corners. Two twenty-six-inch wheels were fitted in boxes under one end, while the other was secured to the main axles, extended for the purpose. This was the contrivance which eventually came to be known as the "cowcatcher"; substantially, it was not changed for years after Robert designed it. He did, however, make several changes in the "John Bull" herself, which helped her to remain in constant service for more than thirty years and finally brought her, after exhibition at the Chicago World's Fair, to her present place in the Smithsonian Institution. As she now stands, she is the oldest complete locomotive in America, offering, in her present appearance, an interesting

comparison with her original design as already described. In the early eighteen-thirties a Philadelphia instrument-maker named Matthias Baldwin took her for his first model. From her he built "Old Ironsides," first product of the now well-known Baldwin works, and later developed "E. J. Miller," a combination of several designs and long the prototype of American standard locomotives. Meantime, as the years passed, the Stevens brothers modified the type of carriage, eventually producing the original American vestibuled train.

Robert was exceedingly anxious to push the track all the way to Amboy before winter stopped his work, but Sing Sing could not supply him with stone blocks fast enough to make this possible. In despair, he resorted to logs laid across the line, with broken rock rammed solidly home around them. When the T-rail had been laid upon these logs, and when the train moved gingerly forward, he made the startling and gratifying discovery that he had an equally serviceable and far more comfortable road-bed—the one, in fact, to which the whole country has now long since become accustomed. It was "easy to see that, with very little attention, the exact line of direction and perfect parallelism of the ways" could be more readily preserved, while "a frame, properly braced, connecting the two ways [rails] together," meant that "their true relative position required only wedging." The "spikes, six inches long, with hooked heads," which Robert had already devised for the old clumsy construction, served equally well for the new "ties"—just as they have served ever since. Similarly, Robert's "iron-tongue" over the rail-joints still persists as the "fish-bar," although the rivets he used have since been replaced by bolts and nuts. Oddly enough, he never took out any patents for these inventions. The fact seems to be that he was usually

too busy over a new idea to make out an application to safeguard an old one. However, the record is clear enough. Just as the labyrinth of threads on a railroad-map of the United States leads inevitably to John Stevens, so the miles of actual steel are Robert's imperishable monument.

CHAPTER TWENTY-TWO

His personal disbelief in betting did not in the least affect the colonel's great interest in every sort of sport. He held athletics to be an important part of a normal education; in his opinion, a man trained to operate a steamboat ought to be equally capable of taking the helm of a sloop or of going ashore and handling a fowling-piece with proper credit. Speed in a foot-race was to him an indication that the runner ought to forge ahead in life. When he was seventy-five, he could still throw a good leg across a horse's back, and he would have been ashamed of any son who did not show the same spirit.

All of them did show it—more especially John Cox. It was he, for instance, who bet Sam Gouverneur that he could produce a man able to run ten miles in an hour. He offered $1000 as a purse and promised to add another three hundred if there should be several competitors and only one to finish within the time. This brought out nine men, to run on a Long Island course crowded with as many spectators as a Derby day. For three miles the whole nine were within six minutes of one another; the half-way mark was reached by five men in less than half an hour. Then the strain told, and one by one they fell out until only three finished the full distance. Henry Stannard, a tall, thin, twenty-four-year-old native of Killingworth, Connecticut, was the winner in the time of fifty-nine minutes and forty-eight seconds. He must have timed himself carefully to have something in reserve, for when the crowd had cheered him to the echo he

climbed upon a box, made a speech, flung himself upon a horse, and galloped around the course before he called it a day.

John Cox's friends were such men as Charles King, Cornelius Low, General Fleming, and Philip Hone. Hone tells in his diary how these four went by sleigh to John Cox's Long Island home and found Commodore Ridgeley, Mr. Botts, and John King already assembled with their host and his brother Robert. "A capital dinner," says Hone, "with fine wines and good fires." When they started back to town, early in the evening, King was driving through the storm at the unlucky moment when they were upset into a snowbank. Digging themselves out and patching the broken sleigh together, they made their way back along the narrow road. Fresh fires and unopened wine awaited them; they made a comfortable night of it; and even the gallant Ridgeley's touch of gout next day did not prevent a repetition of the gathering before the week was out. John Cox, by marrying Maria Livingston—not of the chancellor's immediate family, but of the Lower Manor branch—had become well provided with the means of entertaining in town, too, as Hone again tells us:

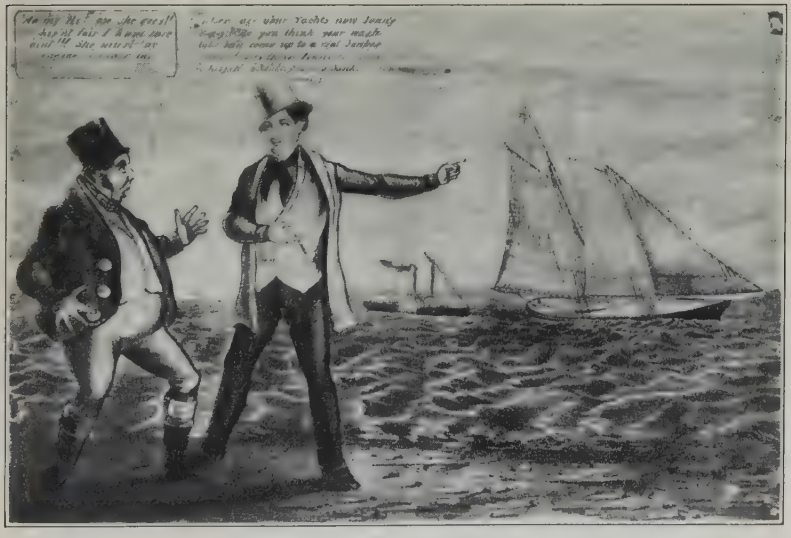
> . . . A splendid dinner at John Cox Stevens'. The Palais Bourbon in Paris, Buckingham Palace in London, and Sans Souci in Berlin, are little grander than this residence of a simple citizen of our republican city; a steamboat builder and proprietor, but a mighty good fellow and a most hospitable host, as all who know him will testify.
>
> Twenty ladies and gentlemen beside our host and hostess were seated, a few minutes before seven o'clock, at a round table of sufficient capacity to accommodate them all pleasantly and conveniently. The ornaments were magnificent and in excellent taste; the dinner consisted of all the delicacies of a French cuisine. The honours of the feast were performed

with the utmost good breeding and unobtrusive hospitality and the company, judging by the constantly spirited conversation which prevailed, exceedingly well pleased with their entertainment. The party consisted of Mr & Mrs James G. King, Mrs Clinton, Mr & Mrs Will. S. Miller, Mrs Ledyard, Mr & Mrs Mortimer Livingston, Mrs Douglas Cruger, Mr & Mrs Henry A. Coit, Mr John A. King, Mr & Mrs James Murray, Mr Anson Livingston, President Moore, Mr Edwin Stevens, Mr & Mrs Will. Kemble, & Phil. Hone.

It has already been noticed how John Cox as a boy was more interested in sailing craft than in steamboats. Taking to heart a remark of his father's that the family hillside and the Hudson together made a natural amphitheater for races, he was always promoting something of the sort. He built and sailed the *Wave*, the *Onkahie*, and half a dozen other craft, each a little faster than the preceding one. Most important of them all was the twenty-five ton schooner *Gimcrack*, for it was in her cabin that he assembled eight other yachtsmen at five o'clock in the afternoon of the memorable thirtieth of July, 1844. It was high time, he told his guests, that a definite organization was made for the taking of regular summer cruises together, the offering of prizes in different classes of craft, and so on. All the guests were enthusiastic; over a glass of wine they promptly resolved themselves into the charter members of the New York Yacht Club. At Windhorst's Coffee House, in Park Row, they held their first official meeting as a club, but before the next season John Cox had built them a small club-house near the water's edge at Castle Point. He was duly elected their first commodore, an office he held until 1854; and it is again Hone who writes of the first regatta:

. . . A gay, saucy-looking squadron—the schooner yachts off the Battery under Commodore Stevens, who flies a broad

THE STEVENS SLOOP "MARIA"



A CARTOON OF THE "AMERICA" AND HER VICTORY

pennant and makes signals like a man-o-war's man. With a company of fair ones and many parties, they were preparing to make a squadron-run to Newport—where their arrival may be counted upon to create a sensation and relieve the monotony of a tolerably dull place of sojournment. . . . (!)

One day when the commodore was out on the river a small craft slipped past him, rounded-to merrily, and came back. A youth was at her tiller, and the straggling letters across her stern caught the commodore's eye. "What boat is that?" he hailed. "The 'John C. Stevens'!" came the answer—and then and there the Stevens-Steers combination was born. Two years before, George Steers, at sixteen, had won the commodore's prize with the *Martin Van Beuren* of his own building; with his new craft, he beat the *Unexpected*, the *Sylph*, and the *Johnny-on-the-Green*. The list of the yachts he afterward designed—most of them of the "cod's-head-and-mackerel-tail" type—is a long and impressive one, but presently he broke away from convention and brought out the *Mary Taylor*, with straight raking keel, longer, easier bow, and clean afterbody. According to Scott Russell, he developed this new model with the commodore's encouragement and with helpful hints from Robert Stevens, the great master of stream-lines. Then he went on to bigger things. There were several men in the great syndicate of 1850—Vice-Commodore Wilkes, Colonel James Hamilton, Finlay Beekman, George Schuyler, and, of course, Edwin Stevens. But John Cox, at the head of the syndicate, repeatedly said that "to Mr George Steers alone were due the model and construction of the yacht *America*." Some confusion upon this point may have arisen from the fact that the grand old schooner was first tried against the big Stevens sloop *Maria*, designed by Robert Stevens and the best of her class. In the actual races the *Maria* was the faster of the two, but, as John Cox

hastened to point out, the *America* had a sea-voyage ahead of her, while the *Maria*, with her huge spread of canvas and her ninety-five foot boom, was meant for inland waters. He had no doubts about the *America*.

Messrs. Thompson, Stephens, and Swan have written the splendid story of the winning of the Squadron Cup, much of it the words of John Cox. With Edwin, he joined the *America* when she reached Havre after her Atlantic crossing and started for England. When a thick fog that forced them to anchor a few miles from Cowes had lifted, the swift British cutter *Lavrock* came out "to show the Yankee the way to port." John Cox himself described what followed:

. . . The wind had increased to a five or six knot breeze and, after waiting until we were ashamed to wait longer, we let her go about two hundred yards ahead and then started in her wake. I have seen and been engaged in many exciting trials at sea and on shore. I made the match of Eclipse against Sir Henry, and had heavy sums, both for myself and for my friends, depending upon the result. I saw Eclipse lose the first heat and four-fifths of the second, without feeling one-hundredth part of the responsibility, and without suffering one-hundredth part of the fear and dread I felt at the thought of being beaten by the *Lavrock*. . . .

During the first five minutes, not a sound was heard save, perhaps, the beating of our anxious hearts or the slight ripple of the water upon our sword-like stern. The captain was crouched down upon the floor of the cockpit, his seemingly unconscious hand upon the tiller, his stern, unaltering gaze upon the vessel ahead. The men were motionless as statues, their eager eyes fastened upon the *Lavrock* with a fixedness and intensity that seemed almost unnatural. The pencil of an artist might, perhaps, convey the expression, but no words can describe it. It could not, and did not, last long. We worked quickly and surely to windward of her wake. The crisis was past—and some dozen of deep-drawn sighs proved that the agony was over.

In all the eventful days that followed, no moment was more dramatic than this one. With her sea-stores still aboard, the *America* was loaded down and far from racing trim; for her it was a stiff test. Yet John Cox had to see that first brush won—no matter what men might say of the indiscretion of thus making it harder to get races afterward. "Take on anything, any time, anywhere," was the commodore's motto, as he intimated in what he soon wrote to the Royal Yacht Club:

> . . . I now propose to run the *America* against any cutter, schooner, or vessel of any other rig . . . relinquishing any advantage which your rule admits is due to a schooner from a cutter . . . ; the distance to be not less than twenty nor over seventy miles. . . .
>
> Although it would be most agreeable to me that this race should be for a cup of limited value yet, if it is preferred, I am willing to stake upon the issue any sum not to exceed ten thousand guineas.

"Things have come to a pretty pass," said "The London Times," "when a New Yorker challenges all England in Cowes Roads and all England hesitates about accepting that challenge. The most singular unanimity of opinion prevails that the Yankee is able to outsail all creation—with the exception, at least, of another Yankee, the *Maria*." And the "Times," at first, appeared to be wholly right, since no one came forward. Presently, however, that great engineer and sportsman, Robert Stephenson, decided that he could stand the situation no longer. It mattered nothing to him that his *Titania* was practically beaten before she started, or that she actually finished nearly an hour astern; he won what he went out to win—a response from other British yachtsmen to the *America's* sweeping challenge.

The rest of the story is familiar enough. Seven schooners

and eight cutters—*Beatrice, Gypsy Queen,* and *Brilliant; Freak, Arrow, Bacchante* among them—assembled to put the Yankee in her place over a course described as "round the Isle of Wight." From Queen Victoria to 'Arry and 'Arriet, all England was there to see it properly done. And what the *America's* place proved to be has come down to us in the legend of the queen's quartermaster, snapping his spyglass together and disgustedly muttering "*America* first —no second!" The book already mentioned tells the whole fine tale, including the queen's personal visit—a royal compliment, by the way, which so overwhelmed Edwin Stevens with shyness that he plunged below and left it to John Cox to represent the family in doing the honors.

When the Marquis of Anglesey, grizzled old leader of Wellington's cavalry at Waterloo, leaned far over the stern in what he pretended was an attempt to see the Stevens screw-propeller which *must* be there, it was John Cox who snatched the old sportsman's wooden leg and pulled him back. Indeed, it was John Cox here, there, and everywhere, from one banquet or celebration to another. So different were his impressions from those gathered forty years before, when he was a friendless stranger in London, that he could not put into words all he brought home. No being cheated by hackney cabmen and coffee-house tapsters on that second visit. He could not set foot ashore without finding a coach and six at his disposal, nor show his face in Piccadilly without being hailed by the nearest newsboy or muffinman. Meeting the British sportsman, he forgot the shopkeeper, and for the rest of his life never ceased to urge Anglo-American friendship by repeating his own words at the New York banquet in his honor: "Long may the bonds of kindred affection and interest, that bind us together at present, remain unbroken!"

Edwin, for all his shyness before royal visitors, was not far behind John Cox. He was vice-commodore of the yacht club for some years and its commodore in 1867, with only a little less yachting enthusiasm than that of his two brothers. As a sea-going sportsman, he comes out in Abram Hewitt's account of an Atlantic crossing the two made together:

> The "Great Eastern" for want of funds had but a scanty supply of bituminous coal, which was supplemented by a stock of anthracite which not a stoker on board had ever used or even seen. The captain, Sir James Anderson, came to us and asked what he should do. So Mr Stevens and I, old as he was and young as I then was, crawled down through many devious passages until we reached the boiler-room and there found a very discouraged lot of people trying to burn anthracite in the same manner as bituminous. Of course, the fire went out. He and I—and mostly he—spent nearly two days in the boiler-room, teaching the stokers, which we succeeded in doing and were finally landed at Brest. This is a simple illustration of the character of this remarkable man.

Ashore, he showed the same spirit, no matter what the occasion for it. In connection with managing the Camden & Amboy, he had made a home at Bordentown for his first wife, Mary Barton Picton, and it was there that Caroline Murat, daughter of the first woman to risk her life on a railroad train, learned enough of him to include him in her memoirs.

> Mr Edwin Stevens, the great railway contractor in the days when railways were in their infancy, had a pretty place not far from the river. He had no children but a sweet wife —so gentle and loving she endeared herself to all around, rich and poor. Mr Stevens' peach orchards, which extended for miles around, were renowned and his great pride was to show them.

The summer of which I am writing, 1846, was a glorious one, the nights surpassing the days in loveliness. We begged for an open-air ball in honor of Prince Joseph. Mr Stevens, whose hospitality was unlimited, was always ready to add to our pleasures and amusements. He decided to give a Peach Dance.

He had the orchards brilliantly illuminated, garlands of lanterns hung from tree to tree, lighting up the beautiful fruit with which the branches were laden. At the nearest end of the orchards, two immense tents spread their wings, one with parquet floor prepared for dancing, the other with tables for supper—where every luxury abounded, from canvas-back, terrapins, and blue-points, to pineapples, jellies and ices. We danced till the sun was high up in the skies, throwing a mellow light over all things. Long was the Peach Dance remembered and talked of! I was Queen of the fete. It was my first big dance in the first year of my 'teens. . . .

I must skip 1847, a dull, weary, uninteresting year of waiting and longing and hoping for the future. One thing I may relate. In the summer of this year I was allowed to pay a visit to Mr Stevens at his villa in Hoboken, near Brooklyn. His wife was dead. Some cousins, the Conovers, were staying with him. Two of the Conover girls were my dearest, I might say, my only, friends.

In the ordinary life of Hoboken, too, Edwin was a sportsman. It was he who annually gave the school children of the town a strawberry festival at Castle Point, and who saw that the poorest in the town received their share of winter coal. Men who worked for him declared that he carried into his business day the theory of the square deal and the sporting chance, practising "loyalty down" and winning "loyalty up" in return. At home he was always called upon to settle the differences which naturally arose in so large a family—often, it must be admitted, over trifles. Joshua Sands and Thomas Conover doubtless had about them a quarterdeck manner which made them no great favorites

with their brothers-in-law, while any disagreements among the men naturally made the Stevens girls take one side or the other. The one unbreakable combination was Robert and Edwin, often backed up by John Cox but with other support scattering. A typical example of points at issue is found in a letter which Colonel Stevens himself, as paterfamilias, wrote to Joshua Sands:

August 22d, 1834

. . . I would wish, for the short time I still have to remain in this world . . . uniformly to preserve peace and harmony among the various branches of my family. . . . But I conceit I have observed a coolness . . . subsisting between my two unmarried daughters and yourself and wife. . . .

They have imbibed prejudices of the most unfounded nature which, I am apprehensive, will not soon be effectually eradicated. . . . I earnestly implore you and your dear little wife to put up with any improprieties . . . which they . . . may manifest towards you. . . . Their education has not been such as I could have wished; their exclusion from general society has rendered them . . . disregardful of the etiquette required of all of us, and I fear they will become, ultimately, cross old maids. . . .

On the subject of the horse and carriage, I made you the following proposition: That they should be considered as the property of the family and their use divided in the following manner. Viz: On every other day, Edward shall come up with the horse and carriage at 9 o'clock A. M. in order, in the first place, to shave me and, in the next place, to take me wherever I may wish to go. The Horse, & Carriage, & driver, to be at your service all the rest of the time. The expense of keeping them to be divided two-thirds to me and one-third to you. To the above, in every particular, I expect you to say "Probatum est."

The colonel was not entirely fair to his two youngest daughters. Esther and Catherine had more than the share of sporting blood expected from their sex a century ago.

When New York had become, for them, a prospect spoiled by the building of residences and warehouses "all the way up to Canal Street," they moved to Princeton. There, an epidemic of burglaries impelled them to buy revolvers, with which they practised so faithfully that they were able, nine times out of ten, to split an apple at fifteen paces. If they were cross old maids, they at least earned the right to be respected.

Rachel, of equable temper and generally beloved, was a restraining influence and quite sufficiently the *grande dame* to prevent the hardiest of her many children from fomenting an actual quarrel in her presence. Her housekeeping once regulated for the day, she spent most of her later leisure in a favorite small rocking-chair within easy reach of the bell-cord. Admittedly, she had too many negro servants—slaves or the children of slaves—and these she treated with overindulgence. Wanting something, she pulled the bell; getting no answer, she resumed her embroidery needle for a few moments, then rang again and again, until some one in the prescribed gray with blue trimmings found it to his or her convenience to wait upon the Lady of the House. Most often it would be Peter who came to her at last—Peter Lee, whose grandmother, Nancy, had been a slave of the Alexanders, and who devoted himself to five generations of the family; Peter, who professed to be such an ardent Democrat, yet revelled in the names and lineage of all that "quality" for which he had so amazing a memory. That his was no head for figures is shown by the family story of his attempt to buy a watch with the twelve dollars given him by one of the children. Finding, in the shop he visited, nothing but a ten-dollar watch, he bargained fervently for an hour and triumphantly bought it for twelve. To the end of his life, at ninety-eight, he could give a circumstantial,

vivid account of the arrival in port of Henry Hudson, three hundred years before, and he died in the belief that the great explorer had discovered the river for the express purpose of giving it to the Stevens family.

Colonel Stevens, although he began to fail physically in his last years of life, never abated his mental activity. With his two great objects—steamboats and steam railroads—become the accepted commonplaces of daily American life and the vertebræ of the nation's agricultural backbone, he turned more and more to abstract study. He wrote, for example, a whole volume on the subject of metaphysics.

A considerable part of this work had been done much earlier, at a time when the colonel thought he might find for his book a market good enough to net a thousand dollars which he could then donate to the fund in aid of "the suffering Greeks in their struggle for independence." He had then hoped to have the benefit of a criticism from Richard, whose knowledge of life ought to be broadened by his travels in the navy and his opportunities of meeting the leading foreign philosophers. But Richard's death occurred in 1828, before all of the chapters, or essays, had been completed. Such as were finished—and about twenty of them are in existence—discussed such subjects as "First Principles," "Perception a voluntary act; how distinguished from Sensation," "Substance, Essence, Matter," "Moral Discriminations," and so on. Rather than a definite system of metaphysics, they present the colonel's attempt to expose the fallacies in earlier books and thus "evolve the truth as far as possible." Pythagoras and Plato; Hume, Locke, and Berkeley; Newton, Descartes, Leibnitz, and Malthus—these and a dozen others were quoted, often with the purpose of presenting quotations in pairs, to show how some particular authority flatly contradicted himself. In his preface the

colonel suggested that these "extracts will form a pretty accurate compendium of the opinions and leading principles of the authors quoted, and may therefore be of some use to those whose occupations in life do not admit of a more elaborate investigation of this abstruse subject." Moreover, he added, "the quotations, without any comments, clearly demonstrate how unsatisfactory and inconsistent are many of the statements advanced by metaphysical writers." He felt that should he fail in adding anything to human knowledge of the subject, he would at least "have the consolation of failing in an enterprise that has baffled the most illustrious." The generally critical tone of his writings may be illustrated by one example:

> It is very certain that there exist in nature a cohesive and a repellent principle. The component parts of bodies are held together by the one and separated by the other. Newton has called these powers attraction and repulsion.
>
> Now, if it has been found that these powers operate universally upon all existing bodies and if, also, they are sufficient of themselves to account for all the varieties we find in bodies in respect of hardness and softness, penetrability and impenetrability, it is certainly unphilosophical to assume—arbitrarily and without proof—another principle: To say that the primary parts of matter must consist of solid atoms, because we cannot conceive how properties can subsist without substance, is certainly taking great liberties with nature. The fact is, the hardness and what is vulgarly called the solidity of bodies in no instance depend upon atomic hardness and solidity; for in that case all bodies would of necessity be hard and solid.
>
> Of what are the substrata of the various powers and energies of nature we are totally ignorant, but that such powers and energies exist we plainly perceive by their operations. I further contend that if such a *matter* as Newton has described really did exist, it would be impossible for us to acquire any knowledge of it, from its very nature. It is now the universally

received opinion that all our knowledge of things existing without us is derived from impressions made upon the senses. Now I would ask in what manner can the *internal* texture of an atom—which is hard, solid, and impenetrable—operate upon our sense. It is manifest [that] its hardness, solidity, and impenetrability can never be open to us, as it would then be no longer hard, solid, and impenetrable.

We may, indeed, infer that because the cohesion of the parts of a body resist any force we can exert to cause them to separate, therefore that body is hard, solid, and impenetrable—but how justly this inference is made, let experience determine. The truth is, it is now clearly ascertained that hardness or softness, solidity or fluidity, depend altogether upon temperature; that, by an increase or diminution of heat, all bodies may be made to assume a solid, fluid, aeriform or gaseous form. Until, therefore, we have a better evidence of its existence than merely the resistance of what we vulgarly call hard bodies, we shall take the liberty of dismissing this solid, massy, impenetrable being as wholly unnecessary. Perpetually hanging as a dead weight upon us, it has so embarrassed philosophers that, in their speculations respecting Matter and Spirit, it has drawn them unavoidably into the greatest absurdities.

Among so many authorities, there was scarcely any phase of the science which he did not include. Discussing impressions received through the sense of sight, he said: "I shall quietly remain convinced that the curious and truly wonderful apparatus I call *my eye* is indispensably necessary for the production of vision; and, if necessary, I have every reason for presuming that the picture thus delineated on the retina is actually formed on the percipient being I call *myself*." When he had turned to a consideration of *space*, he reminded his reader that "Des Cartes was so enamored of a *plenum* that he declared nature abhorred a vacuum," and yet Newton "was compelled to require empty space, void of any resisting medium, in order that heavenly bodies might

not be impeded in their courses." Again, discussing "metaphysicians of the Cartesian School on their own ground," he said "they tell us matter is inert; incapable alike of motion, thought, or design. Now, we find in the works of nature the most incontestable evidences of motion, thought, and design. What then are we to infer? Evidently that the Power of the Great Architect pervades the whole system! This conclusion, however sceptics may cavil, will ever be held by sound minds as incontestable." Quite frequently he thus wove together his philosophy and his religion; being, in the latter, what is generally understood by the term "low" church and disinclined to accept either mere ceremonialism or dogma. And that he discussed points of this sort with his children is shown by a letter of Juliana's, with which she sent him "an interesting and learned work for anyone who believes in the eternity of the soul." Although she was "aware that our opinions differ widely" on the matter, Juliana hoped that her father would "agree with the author, Mr Horne."

As an omnivorous reader of the philosophers, the colonel was presently moved to write an essay on "Political Œconomy, a science of very recent origin." While he declared himself reluctant to commit his thought to paper, he was, he said, led to do it by reading what the editor of the "American Review" had written in discussing the works of Alexander Hamilton. At the outset of his essay the colonel quoted the particular passage from the "Review" which had aroused him.

"It is universally conceded," says this editor, "that the culture of the soil is, of all the modes in which capital and industry can be employed, the most advantageous; that it puts in motion the greatest quantity of productive labor and that, in proportion to the quantity which it employs, it adds a

much greater value to the annual produce of the capital and labor of a country—to the real wealth and revenue of its inhabitants."

With this as a starting point, the colonel proceeded to expound his own exactly opposite opinion—that "exclusive devotion to agriculture is by no means the true policy of this country." He held it to be obvious that such a course would result either in limiting our population or in increasing it at the expense of revenue. That either would be a serious evil appeared clear to him from the circumstances which "constitute the wealth and strength of a nation: Population and surplus revenue." Unless manufactures and the mechanical arts were developed in America, he saw no hope of her attaining any world position of real importance. "That manufactures," said he, "have not been introduced at an earlier period along the Atlantic section of these States is by no means because it is to their best interest to remain occupied exclusively in the pursuits of agriculture, but from the peculiarity of their local situation." Now, however, the tide of emigration to the West indicated that the demand for agricultural labor on the seaboard was satisfied. Coast land was dear, and not very fertile; hence the Atlantic States might better employ their spare population in manufacturing. Such a course would not only tend to improve methods of cultivating in the West but also result in a "home trade" which, he maintained, would be more advantageous than foreign trade, in that the cost of transportation was reduced. Moreover, the exportation of the manufactured article rather than the raw material would bring about "a saving of expense in the reduced volume of the article, in comparison with its value" and also "a profit to the manufacturer after paying the expense of his maintenance." Finally, he insisted that "the power of a na-

tion, relative to its population, depends upon its surplus revenue."

An important tenet of the colonel's civic faith was general education. "Good Morals and good Government in a Republic," said he, "are only attainable and maintainable by knowledge and information pervading the whole mass of Society." When he was a little over eighty, he seriously considered standing as a candidate from Bergen for the state legislature, upon a platform purely educational. As the foundation of his system, he accepted the public school.

> . . . Let each Township throughout the State make choice of some central and convenient spot or spots for the erection of proper buildings for school-houses. . . . Let the legal voters in each Township at their Town Meetings make choice of a Man or, if necessary, Men duly qualified as a teacher or teachers. But how are these teachers to be adequately remunerated for their services?
>
> I answer—from the Railroad Fund. Let a Company or Companies be incorporated upon the plan of the South Amboy and Camden Company, for forming railroads everywhere throughout the State. The fund by these means produceable would be amply and abundantly adequate for effecting the object in view. Whenever the avails of the fund became adequate (which, no doubt, they would very soon do) an eligible site must be determined upon by the Legislature for the erection of a suitable University, where professors in every art and science are to be employed to give a finished education to the students. And, in order to excite a laudable spirit of emulation, scholars of the schools in the several Townships throughout the State shall annually elect one of said students, not under the age of 14 years, who—if found to be properly qualified—shall be entitled to enter the Freshman Class and to remain at said University for four years.

So much for schools supported by the public. Privately, it was the colonel's hope that some of his estate might be

devoted to founding and sustaining an "academy" for teaching fundamental subjects and the elements of science. Because of the complications in which his property had become involved through a myriad of steamboat and railroad projects, he had no money to leave for such a purpose; he could do no more than bequeath the idea to Edwin. For thirty years Edwin, working to put the estate upon its feet, kept the purpose before him, particularly after he inherited much of Robert's personal fortune. On April 15, 1867, the eve of his sailing on the *Great Eastern* as already described by Abram Hewitt, he made a will setting aside a block of land, a building fund of $150,000, and an endowment of $500,000. As trustee for these, he named his widow, Martha Bayard Stevens, descended—by curious coincidence—from those very Bayards who had once owned the whole broad stretch of Hoboken. To help her achieve his purpose, Edwin appointed her brother, Samuel B. Dod, and his own associate of many years in the land and improvement company, W. W. Shippen, as fellow-trustees. The specific duty of the three was to establish an "institution for the benefit, tuition, and advancement in learning of the youth residing, from time to time hereafter, in the State of New Jersey." Upon them he laid the work of thus making another of his father's dreams come true, and it was they who decided that the course of study should be technical, thus eventually creating the first American degree of mechanical engineer.

On the third Wednesday of September, 1871, Stevens Institute of Technology, opening its doors to twenty-one students, began a record that has ever since been bright. Its history is yet to be written, but this will be essentially the story of the two men who have been, up to this writing, at the head of it. The first choice of the trustees was Dr. Henry Morton, a scholarly general scientist who was in-

ternationally known as the chief decipherer of the Rosetta Stone and its key to ancient hieroglyphics. For thirty years Dr. Morton so devoted his great abilities to winning success and recognition for his charge that, upon his death, a successor seemed impossible to find. To maintain and to raise still higher the standard already set, the new president must be one to command instant respect inside and outside the walls of the institute. He must be willing to lay aside the natural ambition of a very successful engineer for the more spiritual one of leading youth into its own battle. Young enough and blessed with sufficient sense of humor to appreciate youth and win its ready sympathy, he must yet be filled with the wisdom expected of older heads. While recognizing the importance of college-taught theory as traced from the footprints of the pioneers, he must nevertheless accurately weigh and explain the value of knowledge to be gained only in the later school of practice and experience. As the administrator of an endowment already inadequate to meet the rapidly rising cost of education, he must possess a sound knowledge of economics. Rather than essaying the pedagogic rôle of educator, he must conform closely to the doctrine of John Stevens that "it is by sober common-sense and strict attention to business that the affairs of this world are to be regulated." At the same time he must have vision too, like the colonel's, since, as a builder for the future, he must dream great dreams and fight with unflagging courage to realize them. In short, less by precept than by example he must, in assuming the place of a leader, prove himself a man. With these qualifications in mind, the unanimous choice of all concerned was Alexander Crombie Humphreys.

Not long ago President Humphreys said: "Here at Stevens we are doing our best to train men for the profes-

sion of engineering and for sane and honest citizenship." Upon this principle the memorial erected by Edwin Stevens to his father and his brothers has risen into a family monument. It is a greater crown than Colonel John Stevens, when his long life ended on March 6, 1838, had ever asked. If anything, the sons who carried on long after he was gone were even less inclined to seek fame for what they did or tried to do. For them all, it was enough to feel that the great object of their efforts had been recognized and attained. Transportation, by land and water, had been made the vital factor in American progress and prosperity.

INDEX

Abbott, George, superintends dredging operations on Delaware, 327.
Accommodation Line, for passengers across Jersey, 352.
Adams, Henry, comments on New York, 144.
Adams, John, on constitutions and governments, 90.
Alexander, Czar, offered Stevens projectile, 401.
Alexander, Elizabeth, (see *Elizabeth A. Stevens*).
Alexander, James, a power in colonial Jersey, 25, 45, 46, 48, 79.
Alexander, William, (see *Stirling*).
Allaire, James P., builder of early engines, 129.
Anderson, Captain John, builds docks at Hoboken, 182.
Anglesey, Marquis of, on board *America*, 516.
Astor, John Jacob, offers to finance Hoboken, 491.

Baldwin, Mathias, uses "John Bull" as model for his first locomotives, 508.
Bancroft, Secretary, stops work on Stevens Battery, 420, 422.
Barber, John, internal combustion in Britain, 140.
Barton, Matthew, reports on Voight as ingenious, 124.
Bartow, Thomas, reports on Johnny Stevens, 31.
Bayard, Samuel, an early owner of Hoboken, 87.
Bayard, Senator, writes Fulton on Delaware steamboats, 295.
Bayard, William, of Revolutionary Hoboken, 82.
Beardsley, Rev. John, receives degree at King's College with John Stevens, 43.
Beaumont, early British railways, 357.
Beese, West Indian plutocrat, 116.
Belcher, Governor Jonathan, of New Jersey, 29.
Berkeley, Lord Proprietor of New Jersey, 9.
Bernard, Governor of New Jersey, 34, 37.
Bernouli, on the mathematical principle of the screw propeller, 186
Binney, Horace, leader of Philadelphia bar, 268, 345, 396, 447, 467; on Fulton's patents, 444.
Brearley, Judge, letter to, on Jersey ratification, from the Hon. John Stevens, 94.
Bloomfield, Governor Joseph, of New Jersey, signs reprisal steamboat legislation, 296, 328.
Board on projectile designed by Robert Stevens, 387.
Bodine, Gilbert, builds villa for Colonel Stevens, 83.
Bogart, ferryman, of Hoboken, 87.
Bogle, Dr., tutor of the Stevens boys, 143.
Bomford, Colonel, reepresents War Department in contract for Stevens projectiles, 396, 402.
Boudinot, Elias, reports difficulties in Continental Congress, 69.

Boulton and Watt, leading British engine builders, 133, 190, 211, 233.
Bowling Green, home of the Hon. John Stevens, 35.
Bowman, Thomas, receives the Hon. John subscription in lieu of enlistment, 70.
Boyd, Congressman, opposed to extension of patents, 332.
Brewster, on Hulls as inventor, 158.
Brigades, Continental, at battle of Germantown, 61.
Brinton, designs the grasshopper tractor, 357.
Brunel, Kingdom, builds the *Great Western*, 142.
Brunel, Marc Isambard, as assistant to Colonel Stevens, 139.
Brunswick Line, organized by Colonel Stevens, 264.
Bunker, Elihu, packet and steamboat captain, 327.
Burger, Elias, builds dock for No. 7, Broadway, 95.
Burgoyne, General, at Saratoga, 65.
Burnaby, traveler in America, on conditions, 30.
Burr, Aaron, organizes bank disguised as water company, 133, 147.
Bushnell, David, designs first submarine, 186.
Butler, Fanny Kemble, notes on Hoboken, 492.
Byrd, Commander Richard, U.S.N., an infringer on Lindbergh's patent, 336.

Calhoun, John C., on railroads, 439.
Campbell, Ann, wife of Mr. J. Stevens, founder of the family, 11.
Campbell, John, proxy for East Jersey proprietor, 11.
Campbell, Samuel, as a tenant of Colonel Stevens, 179.
Carroll, Charles, on giving Parliament bullets, 50.
Carleton, Sir Guy, commanding British forces in New York, 76.
Carter, Nathaniel, editor of the *Statesman*, on railways, 495.
Carteret, Lord Proprietor of New Jersey, 9.
Cartwright, letter from Fulton, 186.
Castle Point, Hoboken home of the Stevens family, 321.
Chamberlain, C. D., infringer upon Fulton's patent, 336.
Charlton, Mrs., her British countrymen disliked by John Cox Stevens, 204, 206.
Chew, counsel for the Hon. John Stevens and James Parker, 48, 63.
Church, Samuel H., on early American railroads, 482.
Clark, Abraham, on difficulties of Continental congressman, 69.
Clausen, Dierck, early owner of Hoboken, 81.
Clinton, De Witt, on canals and railroads, 213, 358, 360, 362, 370, 465, 475, 483.
Clinton, Sir Henry, attacks Lee at Monmouth, 66.
Coffee House, Tontine, favorite gathering place used by Colonel Stevens for demonstrations of experiments and for auctions, 180, 227, 265.
Coffee House, Windhorst's, first meetings of New York Yacht Club, 512.
Colden, Cadwalader, go-between in Fulton - Stevens controversies, 129, 335, 339.
Colden, Governor, of New York, in relation to Stamp Act, 38, 44.
Commissioners, Jersey, to the Indians, 34.

Commissioners, railroad, first in New Jersey, 383.
Committee, legislative, on North Carolina grant to Colonel Stevens, 343.
Committee, Manhattan Company, on New York water supply, 147.
Committee, Naval Affairs, 406.
Committee, North Carolina, action of, on Fulton's protest against Stevens grant, 343.
Communication, character of colonial, 10.
Connelly, John, first president of Pennsylvania Railroad, 467, 482.
Conover, Francis S., grandson of Colonel Stevens, 459.
Conover, Commodore Thomas A., U.S.N., corresponds with Richard Stevens, 452, 518.
Cook, William, survey for Camden and Amboy Railroad, 500.
Cornbury, Lord, character and government, 9.
Cosans, Barna, employs first Stevens in America, 8.
Cox, Colonel John, makes Continental ammunition, 73; candidate for Congress, 99.
Cox, Mary, counts spermaceti candles, 116.
Coxe, Daniel, imprisoned in Paris, 183.
Coxe, Esther, a New York society belle, 453.
Coxe, Dr. John Redmond, correspondence with Colonel Stevens, 174.
Coxe, Sarah Cox, takes her ease, 174.
Coxen, plans new steamboats, 297, 324.
Craig, Colonel, stabs tavern waiter, 72.
Crawford, Secretary W. H., letter from Colonel Stevens on projectile, 397.
Crowell, Thomas, offers the Hon. John opportunity in slave-traders, 30.
Crowinshield, Admiral, connection with Stevens projectile, 389.
Cruger, John, joins the Hon. John in opposing Stamp Act, 39; successful in New York politics, 44.
Cugnot, early steam-carriages, 357.
Cummings, General, Jersey stage-operator, 179.
Curtis, Joseph, reports on Stevens screw-propeller, 198.

Daschkoff, Russian Minister, connection with Stevens projectile, 399.
De Cline's wharf, New York objective of Stevens ferries, bridges, and tunnels, 180, 223.
De Graw, John, subscriptions opened for Brunswick Line, 265.
De Lacy, John Devereau, Fulton's agent in attacking North Carolina grant to Stevens, 334, 341, 434.
De Lome, du Puy, builds French ironclad fleet, 414.
De Peyster, Frederick, letter from Renwick on Stevens propeller, 185.
De Peyster, John, manager of Stevens ferryboats, 459.
Deare, Jonathan, surety for New Jersey's treasurer, 52.
Decatur, Commodore Stephen, U.S.N., correspondence with, on projectiles and ironclads, 387, 394.
Delany family, at Basking Ridge, 57.
Depuy, Jacob, builds villa for Colonel Stevens, 83.
Devil's Feather Bed, a Stevens copper mine at Rocky Hill, 11.
Dickerson, Mahlon, position in public life and views on railroads, 360, 383, 385, 412, 497.

Dickinson, H. W., biographer of Fulton, 133.
Directors, early, of Pennsylvania Railroad, 467; later, 482.
Dod, Captain A. B., U.S.N., commands Stevens ironclad *Naugatuck,* 431.
Dod, Daniel, partner of Aaron Ogden in steamboats, 353.
Dod, Samuel B., trustee of Stevens Institute, 527.
Donaldson, engineer, experiments with expelling water as means of driving steamboat, 104.
Doughty, Charles, classmate of Colonel Stevens at King's College, 43.
Drew, Uncle Daniel, steamboat operator, 490.
Dripps, Isaac, assembles "John Bull" for Camden and Amboy Railroad, 500, 504.
Drummon, Evan, memorial mentioning Mr. J. Stevens, 17.
Drummond, Earl of Melfort, East Jersey Proprietor, 11.
Duane, James, houses and tutors Johnny Stevens, 40.
Duane, William J., correspondence with Colonel Stevens on dredging Delaware and on railroads in Pennsylvania, 328, 360, 378.
Duer, William Alexander, attacks Colden's accounts of Fulton, 129.
Dunham, steamboat efforts in Connecticut, 353.
Dunlap, Johnny Stevens gets ticket in lottery of, 36.

Egbert, D., builds villa for Colonel Stevens, 84.
Elmore, Dr., in Continental Congress with Witherspoon, 70.
Elizabethtown Purchase, Stevens in connection with, 10.
Elysian Fields, as pleasure resort in Hoboken, 181.
Emerson, J. B., in propeller suit against Ericcson, 197.
Emmet, Thomas Addis, of Ogden's counsel in Steamboat Case, 462.
Ericcson, John, as developer of screw-propeller, 195; railroads, 357; *Monitor,* 420.
Etherington, Major, at Basking Ridge, 57.
Evans, Oliver, as designer and correspondence with Colonel Stevens, 174, 335, 342, 360, 376.
Evans, Admiral R. D., as old-school seaman, 411.
Evans, Captain Samuel, furnishes means for experiment with Stevens projectile, 389.
Ewing, Thomas, (see railroad commission in New Jersey).

Farmar, Colonel, report referring to Mr. J. Stevens, 17.
Fenwick family, as loyalists, 25.
Ferrand, William, supports Colonel Stevens in railroad plans, 474.
Fitch, John, early efforts and correspondence with Colonel Stevens on horseboats, 100, 103, 105, 108, 124, 128, 132, 178, 187, 269, 280.
Floy, Michael, associated with Colonel Stevens in greenhouses.
Floyd, John, supervises building *Phoenix,* 236, 257.
Fly, smoke-jack, early term applied to propeller, 193, 254.
Forsyth, horticulturist, prepares plaster for trees, 144.
Fowler, Major Theodosius, assists in financing *Phoenix,* 325.
Franklin, Benjamin, proposes method of propelling boats, 104.
Franklin, Governor William, of New Jersey, attitude toward colonies and crown, and methods of, 37, 39, 47, 49, 54.

French, Daniel, designs steamboat, 295.
Fulton, Robert, planning to leave Paris, 183; torpedoes, 227; position at outset of Hudson Monopoly, 233; first patent, 268; Morgan Library manuscript, 268; declines to show patent, 272; as seen by Voight, 280; second patent, 308; 259-274; 281-285; 295-298; 301-311; 323; 331-343; 353, 358, 367, 390, 395, 434, 437.

Gailer, William, builds *Phœnix*, 236.
Gallatin, Secretary, on transportation, 449
Garnett, M. Russell, marries daughter of Edwin A. Stevens (IV), 430
Gates, General, letter from Livingston, 53.
Génet, Citizen, activities, 114, 115.
Gibbons, William, activities in Jersey steamboats and in Steamboat Case, 443, 462, 471
Girard, Stephen, interest in railroads fostered by Colonel Stevens but not great, 447, 467, 470, 482.
Godwin, David, operates *Juliana* as the earliest steam ferry, 310
Goldsborough, Commodore, U. S. N., uses *Naugatuck* in campaign, 430.
Gordon and Darmer, British seed merchants, agents of John Stevens, 145.
Gouverneur, Samuel, bets on races with John Cox Stevens, 510.
Griffith, development of screw-propeller reflects Colonel Stevens, 197.
Guest, Sir John, manufactures steel rails for Robert Stevens, 501.
Gulick, John, stage-coaches in New Jersey, 287, 316, 382.

Hale, Senator John, appealed to by Edward Stevens to finish Battery, 427.
Hall, Captain Basil, R. N., describes Delaware steamboating, 485
Hall, John, mechanic assisting Colonel Stevens in 1793, 118.
Hamilton, Andrew, lands adjoining Stevens property in Amboy, 13.
Hamilton, William, horticulturist, exchanges specimens with Colonel Stevens, 146.
Hancock, John, as early smuggler, 23.
Hardy, Governor, of New York, confers with the Hon. John, on preparedness, 33.
Hardy, General Thomas, comments on screw-propeller of 1804, 200.
Haring (or *Hearing*), Cornelius, agent for confiscated Jersey estates, 82.
Hare, Dr. Robert H., Jr., correspondence with Colonel Stevens on screw-propeller, 193, 197.
Hart, John, his farm the scene of Washington's encampment, 66.
Hartshorne, Hugh, chancery suit against the Hon. John and others, 48.
Hautefeuille, Abbé, internal combustion engines, 140.
Hawkins, Governor, of North Carolina, in connection with grant to Colonel Stevens, 341.
Hayne, Senator, on preparedness, quoted by Colonel Stevens, 413.
Henshaw, Secretary, stops work on Stevens Battery, 420.
Heth, Captain Harry, proposals to, for Virginia railroads, by Stevens, 376.
Hewitt, Abram S., account of Colonel Stevens, 135, 454, 517, 527.
Hewitt, John, pattern maker at Soho, 129; passenger on Stevens steamboat of 1798, 135.

Hill, John H., sees first screw-propeller, 185.
Hone, Philip, accounts of the Stevens men from diary, 436, 506, 511.
Hopayock, Susquehanna chieftain, confers with the Hon. John Stevens, 34.
Hopkinson, F., counsel at Trenton, Fulton as witness, 434.
Hornblower, J., obtains caveat against Stevens in England, 204, 207.
Hosack, Dr. David, horticulture and sanitation, 145, 214, 445, 491.
House, Colonel James, U. S. A., reports on Stevens projectile, 386.
Howden, Michael, lot as boundary of Stevens property in Amboy, 14.
Hubbard, Guy, account of Samuel Morey, 129.
Hudson, Henry, vessel on the Hudson, 80.
Hulls, Jonathan, as inventor, 158.
Humphreys, Dr. Alexander C., second president of Stevens Institute, 528.
Hunt, John, chancery suit against the Hon. John Stevens and others, 49.
Hunterdon, County of, a Stevens stronghold, 18.
Hutchings, John, account of John Fitch, 128.

Institute, American, examines screw-propeller of Colonel Stevens, 197.
Institute, Stevens, founded at death of Edwin A. Stevens, 527.

Jackson, Andrew, letter to, from Colonel Stevens, 500.
Jackson, John, wins oratory prize and becomes counsel to Stevens, 494.
Jay, George, receives from Thornton a description of Fulton as witness, 434.
Jefferson, Thomas, as Secretary of State, 91, 108, 110, 115, 178, 225; on railroads, 440.
Jenkins, Captain Abisha, commands *Phoenix*, 327, 436.
Jersey Blues, Campbell Stevens a soldier in, 18, 34.
John Bull, locomotive, built by Stephenson for Robert Stevens, 506.
Johnston, Andrew, partner of the Hon. John Stevens, 12, 34.
Johnston, John, partner of the Hon. John Stevens, 12, 33, 52.
Juet, Robert, first recorded description of Hoboken, 1609, 80, 321.

Kayaderosseras, first Stevens property in America, 8.
Kearny family, character of, 20.
Kenersley's college, attended by Johnny Stevens, 35.
Kennedy, Captain Archibald, purchase for Mrs. John Stevens, 42, 87.
Kent, Chancellor, decrees and injunctions, Hudson Monopoly, 443.
Keyworth, early Jersey innkeeper, 290.
King, Charles, on the Stevens family, 373, 460, 511.
King, Rufus, on railroads, 360, 450.
Kinsley, Appollos, Colonel Stevens buys engine of, 151.

La Foucherie, John, Jersey coach operator, 287, 290.
Latrobe, lost chapter in steamboat history, 341; objections to steamboats, 157.
Le Bon, illuminating gas, Livingston's letter on, 165.

Lee, Francis B., early Jersey land as the important factor, 11.
Landowners, on the line of Stevens railroad survey, 379.
Lee, Peter, negro servant in Stevens family, 520.
Lehman, William, doubts success of railroads in Pennsylvania legislature, 482.
Letson, Robert, early Jersey stage operator, 287.
Lewis, Governor, of New York, favors Monopoly, 250.
Library, New York Society, founded, 118.
Lievin, Count, Russian ambassador to Britain, Projectile negotiations with, 399.
Ligle, Thomas, officer of *Naugatuck*, 429.
Lindbergh, Colonel Charles, priority in flying rights, 336.
Lindenthal, Gustave, bridge building, 221.
Livingston, Brockholst, declines to subscribe to Brunswick Line, 271, 305.
Livingston, Edward, addressed by Colonel Stevens on Robert Stevens as secretary of the navy, 413.
Livingston, John R., operates *Raritan*, 262, 306, 443; cuts rates to ruin *Phoenix*, 271.
Livingston, Mary Stevens, daughter of the Hon. John Stevens, marriage to Chancellor Livingston, 26, 44, 49, 53.
Livingston, Philip, in New York politics, 45, 65.
Livingston, Robert L., attempts to make agreement with Colonel Stevens, 338.
Livingston, Chancellor Robert R., marriage to Mary Stevens, 49; Continental congress, 53; Constitutional Convention, 88; catches steamboat fever, 114; aboard Fitch's boat, 128; character, 130; obtains Hudson grant, 1798, 132; doubtful of Roosevelt, 138; views on Manhattan Company, 148; obtains extension of Hudson grant, 156; letter on Napoleon I, 164; first letter on Fulton, 183; steamboat position in 1807, 232; opens debate on patent laws, 238; tired of steamboats, 305; death, 337; views on railroads, 366.
Livingston, Governor of New Jersey, correspondence with the Hon. John Stevens, 59, 60, 64, 83, 91.
Loos, Charles, early surveys for Colonel Stevens, 219, 468.
Lucas, of North Carolina, reports Fulton's attack on Stevens grant, 334.
Lyell, Fenwick, commands Stevens ships, 25.
Lynch, Jasper, constructor of *Robert Fulton*, 410.
Lyttleton, William, inventor of hand-driven propeller, 187.

McBride, Dr., experiments with salt water for sanitary purposes, 214.
McCall, the Misses, invitation serves as drawing-paper for Colonel Stevens, 145.
McEvers, Eliza, Robert Stevens, charmed by, 453.
McKnight, Patrick, buys first Stevens property in America, 9.
McMaster's History, on early freight rates, 359.
McQueen, Robert, early machine shops, 152, 190, 215, 348, 388.
Madison, James, correspondence with Fulton and Stevens, 123, 225, 256, 388, 393; views on railroads, 439.

Manfredi, Signor, death defying feats of, 181.
Manhattan Company, organization and Colonel Stevens as consulting engineer of, 147, 190, 446.
Marselison, Marcellus, the only landowner damaged by the Stevens road-building, 169.
Marshall, Chief Justice John, decides Steamboat Case and breaks Hudson Monopoly, 234, 462.
Mason, Secretary J. Y., authorizes resumption of work on Stevens Battery, 420.
Mehelm, Major John, directs Captain John Stevens to escort Governor Livingston, 60.
Melville, Admiral George, U .S. N., on Robert Stevens, 414.
Mitchell, Dr. Samuel L., on yellow fever, 120; presents bill for Hudson grant in New York legislature, 132; Philadelphia editor, 175; asked to support Colonel Stevens' plans for the Chesapeake, 301; asked to support railroads, 375.
Mitman, Carl, curator of Smithsonian, describes the Stevens steam carriage, 477.
Monmouth Purchase, a Stevens interest, 10.
Monopolists, East Jersey, in 1707, 10.
Monopoly, Hudson, 231; account of, chapter II; doomed, 435.
Monroe, James, 123, 206, 301; asked to support Stevens plans for mobile navy, 404, 457; appealed to on railroads, 440.
Montagnes, Russes, suggested for Hoboken by Dr. Richard Stevens, 479.
Moore, Benjamin, classmate of John Stevens at King's College, 43.
Moore, Sir Henry, governor of New York, dissolves assembly, 44.
Moore, Richard Channing, tutor of the Stevens boys, 143.
Morey, Captain Samuel, account of, 129; 187.
Morgan, John, shipways at Hoboken, 229.
Morgan, Joseph, builds *Phoenix*, 236.
Morris, Gouverneur, 43, 94; disapproves railroads, 358, 360, 370.
Morris, William, governor of Pennsylvania, confers with the Hon. John Stevens on preparedness, 33.
Morrison, steamboat historian, 410.
Morrison, Michael, Colonel Stevens secures patent of, 297.
Morton, E. L., officer of *Naugatuck*, 429.
Morton, Dr. Henry, first president, Stevens Institute, on Edwin Stevens, 417; 527.
Murat, Princess Caroline, first woman passenger on Camden and Amboy railroad, 507; her daughter on Edwin Stevens, 517.
Murphy, A. D., chairman of legislative committee on Stevens grant from North Carolina, 343.

Napoleon, I, 146; account of, by Robert Livingston, 164; 206.
Napoleon III, ironclad fleet of, 414.
Newcomen, studied by Colonel Stevens, 117, 193.
New Jersey, under Cornbury, 9.
Newspapers:
Amboy lottery at J. Stevens' house, *American Weekly Mercury*, 14; anonymous attacks on Colonel Stevens, *American Citizen*, 265 Bayard's pittyauger stolen, *Gazette*, 87; bridge plans of Colonel Stevens, *Albany Gazette*, *Albany Register*, *New York Evening Post*, *Public Advertiser*, 220-221; canals, *Niles' Register*, 465; De Witt Clinton,

Columbian, 465; De Lacy, letter containing Fulton's attack on North Carolina grant to Stevens, *Raleigh Minerva,* 334; Elysian Fields, *American Citizen,* 181; graduation of John Stevens at King's College, *New York Gazette and Weekly Mercury,* 43; *Juliana,* under Godwin, *Columbian,* 311; race with *Hope, New York Evening Post,* 312; Lewis Stevens buried, *Pennsylvania Packet,* 19; Oliver Evans, *Philadelphia Aurora,* 174; *Phoenix* launching, *Commercial Advertiser,* 257; policies of Lord North, *Rivington's Gazette,* 65; stage coaches in colonial New Jersey, *Philadelphia Weekly Mercury,* 13; Stevens Battery, *New York World, Scientific American,* 425; Stevens letter to editor, describing aerial railway at Hoboken, *Statesman,* 495; Stevens railroad described, *Commercial Advertiser,* 479; Stevens railroad and steamboat plans for Virginia, *Richmond Patriot,* 376; Stevens steamboats on the Delaware, *Daily Advertiser, L'Oracle,* 266; Stevens steam navy documents, not published, *Niles' Register,* 408; *Trenton,* described, *Philadelphia Freeman's Journal,* 460.

Niblo's Garden, exhibit of twin-screw boat, 1844, 197.

Nicoll, Isaac, publishes ferry-rates of 1799, 153.

Nicolson, John, letter on John Fitch from Colonel Stevens, 125, 178.

North, Lord, Revolutionary policies, 63, 65.

North Carolina grant, to John Stevens, 333.

Oakley, T. J., counsel for Ogden in Steamboat Case, 462.

Ogden, Colonel Aaron, enters steamboat business, 313, 353, 434; compromise with Fulton, 355; ruined, 462.

Ogden, Abraham, assists Stevens with turnpikes, 167.

Ogden, D., commissioner on New Jersey boundary, 45.

Ogden, Francis B., American consul, encourages Ericcson, 196, 502.

Ogden, Samuel, suggests suit to open turnpikes, 171.

Otto, Madam, favorite singer in Robert Stevens' day, 454.

Parker, James, associated with the Hon. John Stevens, 36, 40, 45, 48, 57, 60.

Patterson, William, governor of New Jersey, solicits cannon from the Hon. John Stevens, 57.

Pauw, Michael, early owner of Hoboken, 81.

Peartree, Colonel William, J. Stevens goes privateering with, 8.

Peters, Richard, Jr., supports railroad plans of Colonel Stevens, 474, 484.

Phœnix, designed, 230; launched, 257; speed trials, 260; John Livingston offers to buy, 262; *Raritan* cuts rates, 271; first ocean voyage in history, 275; log, 276; inventory, 281; modified in design, 284; fuel, 291; beats sailing packets, 308; further changes, 314; beats rival steamboats, 347; yields to *Philadelphia,* 435.

Picton, Mary B., first wife of Edwin Stevens, 517.

Pierson, Dr., befriends John Cox Stevens in London, 202, 205, 208, 210.

Pleasants, James, chairman of naval committee, appealed to by Colonel Stevens, 394.
Pratt, Judge, reanimates enthusiasm for canals, 438.
Proprietors, East Jersey, position in politics, 9.

Queen Anne, grants land to Mr. J. Stevens, 7.
Queen Victoria, at race for Squadron Cup, 516.
Quick Line, stages across Jersey, 352.

Racehorses, owned by Stevens brothers and friends, 486, 503.
Railroads, efforts and arguments of Colonel Stevens to bring about in America, 357-385; 438; 447-450; 464-483; Camden and Amboy, 500.
Ralston, Gerard, supports Stevens railroad, 474.
Rea, Samuel, justifies prophecies of John Stevens, 221, 381.
Redford's Ferry, a Stevens interest, 13.
Reed, Mrs. Esther deB., letter from Colonel Cox, 73.
Reid, General, befriends John Cox Stevens in London, 211.
Remsen, Henry, correspondence with John Stevens on patents, 108, 109.
Renwick, James, sees twin-screw boat of 1804, 185; reports on it, 198; 200, 233, 259; on *New Philadelphia,* 489; on railroads, 494.
Rhode, at Soho, 129; passenger in first Stevens boat of 1798, 135.
Richards, activity of, in Connecticut steamboats, 353.
Robinson, Beverly, associated with the Hon. John Stevens against Stamp Act, 39.
Rocky Hill, a Stevens interest, 11, 32.
Rodgers, Commodore John, U. S. N., opposes Colonel Stevens on steam-navy, 394, 406, 411.
Rogers, Captain Moses, on board *Phoenix,* 287; 295, 306.
Roosevelt, Nicholas, on Fitch's boat, 128; urges side-wheels, 137; difficulties in boat building, 154; paddle-wheels, 230, 235; 341, 434.
Roughead, Mr., at J. Stevens' door in Amboy, 17.
Rowley, Perez, stage coaches in New Jersey, 287, 289, 316.
Rumford, Count, studied by Colonel Stevens, 117, 165, 206, 496.
Rumsey, James, first attracts Colonel Stevens to steam, 100, 105, 108, 109.
Russell, Scott, history of steam engineering, 461, 488, 513.
Rutherfurd, Walter, associate of the Hon. John Stevens, 45, 46, 57; imprisoned for treason, 58; 60, 79.

Sands, Commodore Joshua R., U.S.N., son-in-law of Colonel Stevens, 480, 518.
Savery, Captain Thomas, studied by Colonel Stevens, 117, 150, 193.
Say, Dr. Ben, correspondence with Colonel Stevens on Fitch's boat, 125, 178, 309.
Sayre, Nathan, builds *Phoenix,* 286.
Schenck, Peter, treasury of New Jersey held by, 55.
Scheybichi, Indian name for New Jersey, 9.
Schuyler, Colonel Peter, commands Jersey Blues, 18.
Screw-propeller, Colonel Stevens makes first successful application of, 186.
Scudder, Nathaniel, correspondence with the Hon. John Stevens on difficulties of Continental congressman, 68.

Sculls, Chinese, studied by Colonel Stevens, 193.
Sedgwick, Charles, chairman of House Naval Committee, appealed to by Edwin Stevens on Battery, 427.
Seely, John, builds Hackensack causeway for Colonel Stevens, 169.
Select Line, stages across New Jersey, 352.
Shippen, W. W., commander of *Naugatuck*, 429; trustee of Stevens Institute, 527.
Ships, built or operated by the Stevens family, *America*, 513; *Burlington*, 485; *Catherine*, 23; *Corinthia*, 459; *Fairy Queen*, 485; *Funchal*, 25, 28; *Hoboken*, 451; *Juliana*, 310, 338, 340, 348, 363, 437; *Little Juliana*, 186, 191, 234; *Maria*, 513; *Martha*, 33; *Naugatuck*, 428; *New Philadelphia*, 487; *North America*, 489; *Olive Branch*, 443; *Onkahie*, 512; *Philadelphia*, 324, 331, 345, 347, 351; *Phoenix*, see *Phoenix*; *Polacca*, 159; *Trenton*, 460; *Wave*, 512.
Shipyards, at Hoboken, building *Naugatuck*, 429.
Shorter, Edward, British inventor of hand-propeller, 187.
Shuff, Nathaniel, New Jersey stage operator, 287.
Skipworth, Fulner, correspondence with Fulton, 187.
Slidell, activity of, in Connecticut steamboats, 353.
Sloan, Jeremiah, secretary, Camden and Amboy Railroad, 500.
Smallman, British mechanic at Soho.
Smith, F. P., developer of screw-propeller, 195.
Smyth, John, treasurer of New Jersey, appeals for help of the Hon. John Stevens, 52, 54.
Soho, plant at Belleville, 130.
Sonman, Peter, East Jersey Proprietor, 14, 48.
Sprague, as designer of side-wheels, 269.
Stannard, Henry, runs ten miles for John Cox Stevens, 510.
Steam, high pressure, opposed in England, 209.
Steamboat Case, breaks Hudson Monopoly, 462.
Steamboatmen, associated with Colonel Stevens, 322.
Steers, George, designs *America*, 513.
Stephenson, Robert, John Bull locomotive built by, 504.
Stevens (generation in America indicated by Roman numeral)
Campbell (II), 18.
Catherine Sophia (IV) 459, 519
Edwin Augustus (IV), birth, 122; family balance wheel, 122; gunnery experiments, 414; proposes ironclad, 415; proposes ram, 418; attempts to complete Stevens Battery, 422; offers her to government, 427; armor and sheathing patents, 429; final efforts on Battery, 431; designs forced-draft system, 489; organizes Camden and Amboy railroad, 500; founds Institute of Technology, 527.
Edwin A., Jr., (V), designs double-ended ferryboat, 351.
Elizabeth Alexander, wife of the Hon. John, 26, 34, 42, 162.
Esther Cox (IV), 178, 519.
Francis Bowes (IV), 112.
Francis Bowes (V), perfects steam cut-off, 507.
Frederick W. (V), vice-chancellor of New Jersey, 15.
Harriet (IV), 178.
James Alexander (IV), 112, 261, 325, 340, 351, 436.

Stevens—*Continued*
John (I), founder of family in America, 8; marriage to Ann Campbell, 11; clerk of Chancery court, 15; Amboy treasurer, 15; warden, St. Peter's church, 15; death and character, 17; 100, 287.
John (II), the Honorable mariner, 23; merchant, 25; agent for James Alexander, 26; marriage to Elizabeth Alexander, 26; partner of Stirling, 27; pressed into public life, 28; Rocky Hill mines, 32; builds Jersey blockhouses, 33; buys No. 7 Broadway, 34; road commissioner, 36; Jersey Royal Council, 38; fights Stamp Act, 39; New York-New Jersey boundary line, 45; views on Chancery court, 47; builds Lebanon house, 50; surety for New Jersey treasury, 52; takes over treasury, 55; president of Revolutionary legislative meetings, 56; Continental congress, 76; presides over New Jersey Constitutional convention, 88; presents ratification to congress, 95; death, 113.
John (III), Colonel, of Hoboken, birth and appearance, 3, 28; genius of steam, 5; early education, 35; graduates, King's College, 43; joins Continental Army, 57; promoted and appointed treasurer of New Jersey, 59; marriage to Rachel Cox, 75; counsel to East Jersey Proprietors, 76; moves to New York, 77; buys Hoboken and builds Villa, 83; interest in steam aroused, 100; urges patent law for protection of inventors, 107; description of early engine, 110; first patent, 111; employs unskilled mechanics 118; interest in yellow fever and city sanitation, 120; proposes first floating hospitals, 121; considers horseboats, 124; early co-operation with Roosevelt and Livingston, 130; the early boat, 131; convinced of efficiency of stern-wheels, 132; gardens and greenhouses, 144; engineer for Manhattan Company, 147; modifies Savery's pump, 150; uses paddles in the stern, 155; turnpikes and Hackensack causeway, 167; correspondence with Oliver Evans, 175; as landlord, 179; attempts to incorporate Hoboken, 182; first news of Fulton, 183; succeeds with screw propeller, 185; requirements for propeller-driven steamboats, 192; letter on propeller, to Dr. Hare, 193; priority as inventor of propeller, 195; report of 1844, by Renwick, 198; applies for British patent of boiler, 201; urges New York city water supply and fire-tugs, 213; a better communication system for New York, 215; plans floating bridges, 217; permanent bridges, 220; vehicular tunnel, 222; plans for defending New York, 225; begins larger steamboat, 230; steamboat position in 1807, 232; opens debate on Hudson Monopoly, 239; interprets U. S. patent law, 242; is anonymously attacked, 265; considers operating on the Delaware River, 273; agreement with Fulton, 283; modifying the design of *Phoenix*, 285; establishes New York-Philadelphia line, 287; plans to visit Europe, 293; investigates Morrison's floats, 297; seeks New York ferry-lease, 297;

Chesapeake efforts, 301; Albany "pendulum", 306; establishes first steam ferry service, 310; plans for Baltimore and Wilmington, 317; on the imminence of War of 1812, 319; builds *Philadelphia,* 324; dredging the Delaware, 327; North Carolina grant, 333; Hudson steam ferry stopped, 340; horseboats, 349; railroad vision, 357; railways against canals, 368; report of Canal Commission, 371; first railroad pamphlet, 372; plans southern railroad, 376; first American railway survey, 379; fighting Jersey indifference, 381; first railroad charter, 383; elongated projectiles, 386; ironclad ships, 390; urges mobile navy, 394; ironclads for Russia, 399; abused by Naval Commission, 407; offers to bet on relative speeds, 409; proposes Robert for cabinet position, 413; redoubles steamboat efforts after Fulton's death, 435; resumes railroad efforts, 438; city sanitation, 447; urges Pennsylvania railroads, 459; second railroad charter, 467; surveys Pennsylvania Railroad, 468; builds first railroad at Castle Point, 477; developing Hoboken, 491, elevated railways for New York, 497; on metaphysics, 521; on public schools, 526; on colleges, 527; death, 529.

John Cox (IV), birth, 85; helmsman of first propeller craft, 185; letters from England, 201; supports American horseracing, 486; organizes New York Yacht Club, 512; heads *America* syndicate, 513; New York house and dinner guests, 511.

Juliana (IV), 178, 453, 458.

Stevens—*Continued*

Lewis (II), 18, 27, 40, 78.

Maria F., wife of James Alexander Stevens, 325.

Maria L., wife of John Cox Stevens (IV), 511.

Martha Bayard, wife of Edwin A., 527.

Mary (III), see Mary S. Livingston.

Mary (IV), 178, 480.

Mary (V), 430.

Rachel Cox, wife of Colonel John Stevens, ancestry, 73; character, 75; 269, 290, 298, 325, 355, 437, 451, 477, 481, 486.

Richard, of St. Clement Danes, father of John (I), 8.

Richard (II), 19; character, 21; 35, 41, 49, 51, 68, 77, 112.

Richard (IV), 292, 401, 438, 479.

Robert Livingston (IV), birth, 85; family leader, 86; engineer of first propeller craft, 185; repairs engine of 1804, 200; compares *Phoenix* with *Claremont,* 269; takes *Phoenix,* to sea, 275; operates her on Delaware, 291; modifies her, 314; designs *Philadelphia,* 324; builds dredging machine, 330; elongated projectile, 386; as seen by Melville, 414; designs ironclad, 416; takes over Hoboken ferries, 437; walking beam and ferry slip, 452; builds *Trenton,* 460; *New Philadelphia,* 487; *North America,* 489; invents T-rail, hook-headed spike, and builds Camden and Amboy railroad, 501-508.

Sarah (II), 41.

Susannah Kearny, wife of Richard (I), 20.

William (I), 17.

Stevenson, Robert Louis, on 18th century engineering, 117.

Stirling, Lady Sarah, letter to Mrs. John Stevens, 67.
Stirling, Lord William of, earldom 26; Jersey Council, 39; boundary line, 45; Continental Army, 57; describes battle of Germantown, 61; on the politics of the Revolution, 64; surveyor-general, 75; St. Andrew's Society, 79.
Stockton, Francis B., as aid to Colonel Stevens on Delaware, 293.
Stockton, Senator R. F., on Colonel Stevens, 373.
Stockton, Richard, member of Jersey Council, 39, 59; joins Fitch company, 178.
Stockton, Commodore Richard, U. S. N., encourages Ericcson, 196.
Stockton, Robert, compromises with Stevens brothers on Jersey railroads and canals, 499.
Stockton, Samuel, as agent for Colonel Stevens, 98, 114.
Stoudenger, Charles, builds early engines for Stevens, later foreman for Fulton, 129, 134, 153, 331.
Street, Robert, internal combustion engine, 140.
Strickland, William, inspects British railroads, 474.
Strong, Selah, letter from Colonel Stevens on defense of New York, 225.
Stuart, Robert, historian of steam, 159, 190.
Steamboat Hotel, used by Colonel Stevens at end of first Jersey railroad survey, 380.
Swartouts, ferry at Hoboken leased to, 436.
Swords, T. & J., printers of first pamphlet on railroads, 372.
Syndicate, *America* built by, 513.

Tatnall, Commodore, C. S. N., letter of, in reference to *Naugatuck*, 430.
Taverns:
Coulter's, on turnpike built by Stevens brothers, 458.
Fraunce's, frequented by the Hon. John's Social Club, 47.
Henderson's, at end of first Pennsylvania railroad survey by Colonel Stevens, 468.
'76 House, leased by James Stevens to Van Buskerck, 436.
Taylor, John, speaker of House, letter on mobile navy from Colonel Stevens, 405.
Teedyscunk, Delaware chieftain, confers with the Hon. John Stevens, 34.
Thomas, Gabriel, historian of colonial New Jersey, 15.
Thornton, Dr. William, 3; life, 178; 219, 266, 269, 272, 282; on Fulton, 309, 434.
Tompkins, Daniel D., governor of New York, report to, on Stevens projectile, 386.
Trevithick, builder of early locomotive, 357.
Tryon, Admiral Sir William, Colonel Stevens appointed attorney by, 44.
Tunnel, vehicular, Stevens, of 1806, 222; Holland, of 1928, 296.
Turner, British advocate of high-pressure steam, 205, 207.
Turnpikes, associates of Colonel Stevens in projecting, 167; incorporators, 172; Jersey commissioners, 168.

Union Line, a Stevens interest, 322.
Upshur, Secretary, authorizes work on Stevens Battery, 420.

Van Cortlandts, Colonel Stevens not regarded as traitor by, 78.

Van Dusen, Nicholas, shipwright, builds *Philadelphia*, 324; 436.
Van Rensselaer, Stephen, urged by Colonel Stevens to promote railroads, 360, 449, 483.
Vanderbilt, Commodore, railroad ideas, 371; as steamboat captain, 443.
Varlet, Nicholas, early owner of Hoboken, 82.
Vignolles, adopts Stevens T-rail, 502.
Voight, Henry, partner of John Fitch, 124, 178, 269, 281.
Von Steuben, Baron, attempts to secure grant of Hoboken, 83.

Wadsworth, Colonel, U. S. A., on Stevens projectiles, 396.
Wallace, Mrs. John, inspects Delaware steamboats for Colonel Stevens, 291.
Ward, John, report on screw-propeller, 200.
Washington, George, letter to, for Johnny Stevens, 57; requests Jersey beacons for collecting militia, 60; attacks Howe's army at Germantown, 61; too busy to write Livingston, 63; triumphal entry into Trenton, 74; letter to, from Morris, on New Jersey view of the Constitution, 94; certificate for James Rumsey, 101; difficulty in communicating with New York noticed by Colonel Stevens, 220; Colonel Stevens's opinion of, 411.
Watt, James, Colonel Stevens hopes to interest, in high pressure, 201; John Cox Stevens has interview with, 207.
Watts, John, presents first Stevens patent petition, 103, 105.
Webster, Daniel, counsel for Gibbons in Steamboat Case, 462.
Welles, Gideon, urged by Edwin Stevens to finish Stevens Battery, 431.
Westcott, accounts of John Fitch by, 124, 132.
Wharton, Robert, appeal to, by Colonel Stevens, in support of railroads, 470.
Williams, Colonel Jonathan, U. S. A., plans for defending New York, 226, 228, 319.
Williams, William, builds *Phoenix*, 236.
Wilson, J. W., officer on *Naugatuck*.
Wilson, Major, U. S. A., railroad surveys of, 482, 500.
Wirt, Attorney General, as counsel for Gibbons in Steamboat Case, 462.
Witherspoon, Dr. John, correspondence with the Hon. John Stevens on difficulties of Continental congressmen, 69, 70, 88.

Yrujo, Marquess d', passenger on early Stevens steamboat, 135.

Zenger, defended by James Alexander as free-speech advocate, 26.